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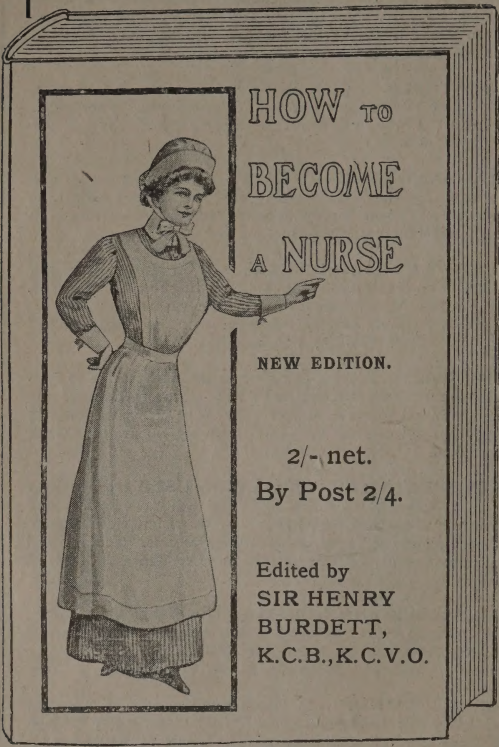
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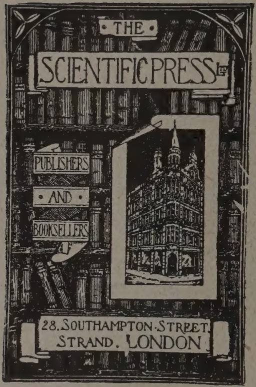
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PREFACE.

My object and reason for writing this book are based upon experience gained in my work of giving these lectures to members of the various detachments of the British Red Cross Society in Gloucestershire, viz. :—

The syllabus is a manifold one, demanding explanation and demonstration in detail; the lecture-hours did not allow time to comply with *all* the requests for repetition of practical demonstrations, or for students to make plenty of notes on details in nursing, etc.; I therefore submit my work in the hope that, as it comprises lectures on all points mentioned in the British Red Cross Society's Syllabus on Home Nursing, it will prove a valuable help to those who have so nobly responded to the "call to duty"; to do all that is in their power to tend and succour the brave men of our nation, by proving themselves valuable and intelligent helpers to the trained nurse.

This work is also intended for use "in the Home".

E. N.

Chipping Campden.

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CHAPTER I.

THE NURSE: HER QUALIFICATIONS AND DUTIES.

The Nurse.—Women who contemplate entering upon the work of nursing the sick and wounded should give the matter careful consideration, also gather from available sources an intelligent idea of the requirements, trials, hardships, and the reward of such exacting work.

To those who possess the necessary qualifications, the work offers a life of unusual interest and usefulness. It opens a wide range of knowledge and unlimited means for self-development, and provides rare opportunities to help others.

But, while the altruistic spirit is developed, it will be found that mere sentimentality will be completely discouraged when subjected to the test of the arduous and monotonous routine of this essentially practical work.

Those who are not adapted to the work, or regard it simply as a means of earning a livelihood, are almost sure to find it irksome, and thus miss its most inspiring features.

The qualifications may be considered under three heads, viz. (1) Physical, (2) Mental, (3) Moral.

Physical.—The possession of perfect health. A strong constitution and unlimited physical endurance are necessary.

Means of maintaining health should be taken by strict obedience to the laws of hygiene, especially personal cleanliness, suitable clothing, adequate amount of fresh air, sufficient rest, the avoidance of causes of indigestion, and attention to slight ailments.

A daily bath is indispensable, not only for cleanliness, but also for its tonic effect on the skin.

The hair should be brushed every night and washed every fortnight, and should be worn brushed back from the face and dressed in a simple manner.

The teeth should be always brushed, and the throat gargled, at least twice a day; but when nursing a patient with an infectious or specific disease, this should be done before every meal and before retiring at night. Bad teeth collect germs, and also cause indigestion.

The care of the hands is of the utmost importance. After handling a patient suffering from an infectious disease the hands should be disinfected before touching anything—even before washing them—by submerging and scrubbing them in a disinfectant for three minutes.

The hands should be kept in good condition by—

1. Using forceps to handle dressings, etc.

2. Rinsing the hands between the use of soap and disinfectant, and wiping them perfectly dry.

3. By applying a lubricant after washing, also rubbing in an ointment at night.

4. Wash the hands before each meal and before retiring. The finger-nails should be cut so as not to form a hiding-place for germs. To prevent infected fingers, keep a constant watch for hang-nails, scratches, or cuts; the latter should be protected with sterile gauze, frequently changed.

Suitable clothing.—The clothing should be of washable material, scrupulously clean; dresses and underclothing frequently changed, so as to secure a desirable freshness. Never use perfumes on the clothing when nursing the sick. Clothing must be neither too tight nor too loose.

Fresh air and exercise.—The nurse should sleep with the windows open, winter and summer; spend part of off-duty time out-of-doors. Walking gives good exercise, imparting new vigour to the entire system.

Sleep and recreation.—At least seven hours is required in order to keep well and to do good work. A diversity of interest is also required in order to keep the mind alert.

Causes of indigestion.—Avoid rapid eating with insufficient mastication. Forget work at meal-times, and try to enter into conversation on interesting topics of the day.

Attention to slight ailments.—Attend immediately to indigestion, constipation, sore-throat, headache, appearance of infected fingers, the breaking down of the arch of the foot, etc.

Mental and moral qualifications.—A liberal education is particularly useful. It fits one to enter into the interests of the patient, and so become a resourceful companion by intelligent reading, conversation, etc., to brighten the tedious hours of convalescence.

It is necessary to have a keen observation combined with sympathy and accuracy in the anticipation of all the patient's needs, without his knowledge that he is being watched; gentleness in manner, touch and voice which helps to ease the mind, and so take away the trials of his illness; unselfishness; making the patient your first consideration, thinking lastly of yourself in your duties in so far as not to expose to undue infection. Quietness in movements, neatness of person, patient, and room.

Avoid careless, unnecessary movements and chatter, also creaky shoes, rustling dresses, jingling instruments; yet, at the same time, prevent nervous movements, and hushed whisperings in the room, or its vicinity. Brightness and cheerfulness are better medicines than dulness and sullen dispositions.

Be collected, and have good presence of mind at all times, especially in emergency.

Truthfulness to doctor and patient. If a dressing or treatment *will* hurt a patient, tell him so, to teach him to realize your duty, so as to gain your power to manage him and his trust in you. Be thorough in all duties; courteous to patient and all members of the staff; dignified; exercise self-control; be economical; have plenty of patience. Absolute cleanliness is essential for a nurse in a sick-room or ward. Cleanliness that is not enthusiastic is not safe. Infection spreads from lack of care. Use tact withal.

Duties of the nurse.—From the commencement of the illness practise methods of making the patient comfortable and of avoiding mental discomfort, by remembering a patient's likes and dislikes; fulfilling his requirements in the shortest possible time; and avoiding anything that would annoy him or dull his surroundings.

The duties are manifold and include:—

1. Observations of the patient, which are numerous, such as: Temperature, pulse and respiration, motions, urine, appetite, vomiting, sleep, delirium, restlessness, pain, cough and sputum, tongue and mouth, nostrils in pneumonia, position in bed, skin, its colour, and rashes, and to recognize rigors.

2. Ventilation and warming of the room.

3. Regulation of admission and leaving of visitors; taking note of the contents of parcels of food, etc.

4. Cleanliness of room, sweeping and dusting, utensils, instruments, bath and lavatory bowls, and W.C.'s.

5. Preparing and serving of food, also feeding of helpless patients, and children.

6. Lifting helpless patients.

7. Prevention of bedsores, and carrying out the treatment of such as ordered by the doctor.

8. Bed-making and changing of soiled draw and top sheets, etc., also body-linen. Care of the teeth and mouth.

9. Blanket and special baths.

10. Taking of and charting temperature, pulse, and respiration. Reporting condition of patients.

11. Administration of medicines and enemata.

12. Dressing of wounds, bandaging, preparing dressings, swabs, and splints.

13. Assistance at operations. To act in emergencies.

14. Making and application of poultices, fomentations, etc.

For illustrations of sick-room appliances, etc., see Chapter XII.

Choice of a sick-room.—In the choice of a sick-room, the outlook is important. One must aim at having a supply of fresh air, penetrated by sunlight, for the greater part of the day.

A southern outlook is good, but it has its drawback from the fact that it gives a hot afternoon sunlight, which necessitates the drawing down of the blinds in the event of the patient wishing to read, or not wishing to sleep during those hours, and in this way the best disinfectant we have is excluded from the room.

A south-western outlook is better for the above reason, or a south-eastern one.

As to position, choose a room away from the busy part of the house, yet not on that side where there is a busy, noisy street, or overlooking a stable or garbage heap, but rather where it is quiet and where there is plenty of air-space. Choose a room at the top of the house, especially in the case of infectious disease, and see that there is provision of a W.C., and good water-supply, and for the removal of excretions, etc., near the room.

Avoid useless and unnecessary furniture, carpets, hangings, because they all take up air-space, collect dust, and also make more work.

Choose a room, if possible, so as to ensure sufficient air-space. The dimensions of floor-space should be such as will give the required amount of air-space; the largest room should be chosen.

Each person should have 1000 cub. ft. of air-space. 100 sq. ft. of floor-space would be given to a patient if the room is of ordinary size, say, 10 × 10 ft., and if the height is 10 ft.; this will give the patient 1000 cub. ft. of air-space.

In hospital wards provision is made for each patient to have this amount of cubic feet of air-space, for example: A ward 120 ft. long, 25 ft. wide, 10 ft. high, would meet the requirements of thirty patients, as follows:—

Length: 8 ft. for each bed, allowing 5 ft. between any two beds (beds 3 ft. wide).

Width: two rows of beds—one row down each side—leaves 11 ft. centre space between the two rows.

Height: Gives each patient 1000 cub. ft. air-space.

Ventilation.—Two important points are to be considered in the ventilation of a room, viz. (1) Size of the room, and the number of its occupants; (2) The amount of air entering and leaving the room each hour.

One must also remember the principles of ventilation. When air is heated it expands and tends to rise. When air is cooled it contracts and tends to fall.

The inlet provision for fresh air should be somewhat larger than outlets to minimize draughts.

Inlets should be at a height of about 5 ft. from the floor, if air is admitted cold, and, as a further precaution against draughts, the current of air should be directed upwards.

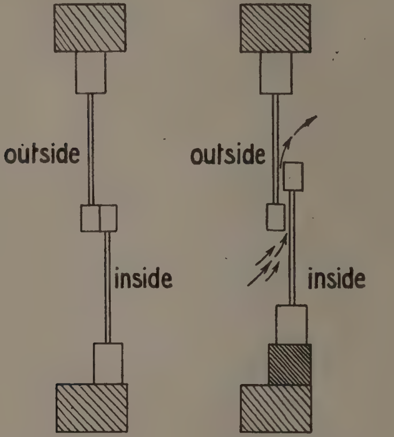
In this way the air reaches the ceiling, so breaking its course, which favours its descent and becoming mixed with, and warmed by, the air in the room, before it is inhaled by the occupants. The source of the incoming air should be considered. It should not be borrowed from adjoining rooms, but must come direct from outside—at the same time avoiding air from a window facing a stable-yard, garbage heap, crowded thoroughfare, or court.

Outlets should in every case be as high as possible, and preferably close to, or near the ceiling.

There is a tendency for fresh air to take a direct course to the outlet, so this must be counterbalanced by a judicious selection of the relative positions of inlets and outlets in ventilation.

Ventilation must be carried on continually, day and night. Do not forget that sunlight is necessary to perfect ventilation. There are few cases, except eye-affections, in which this natural germ-destroyer should be excluded from the sick-room.

To ventilate by the open window: amongst simple contrivances by which the objects may be attained is the Hinckes-Bird's plan, now so well known, of placing a solid block of wood under the entire length of the lower sash-frame of a window so as to raise the top rail of the lower sash above the bottom rail of the upper sash, 3 to 6 in.



Closed window. Lower sash raised and wood inserted.

FIG. 1.—Hinckes-Bird's method of window ventilation.

By this means the pure air is admitted between the two sashes. The top sash must be lowered to form an outlet at the top for impure air.

Instead of the solid block of wood under the lower sash have in its place a light wooden framework, covered with gauze or fine muslin, made to fit inside the space. This will act as a filtering ventilator, and is particularly advisable in cases where it is necessary to use a window facing a dusty thoroughfare. It also lessens the volume of air entering the room.

An open fireplace is a good ventilator. Air being always attracted towards heat, the air in the room is drawn into the fireplace and then up the chimney. Thus a vacuum is created which sucks in the outside air from all available sources. The action of the winds passing over the top of the chimney helps in the ventilation, and its action is the same, in less degree, when the grate does not contain a fire. But this method of ventilation cannot take the place of the open window because it only assists ventilation to a height level with the mantelpiece, impure air rising towards the ceiling.

The fire should have regular attention, using an old glove to add coals, and a piece of wood instead of a poker, so as to avoid noise.

Keep the fire well replenished, when necessary.

Remember that towards the early hours of the morning—three and four o'clock—the air is apt to grow chilly and cold.

Wards and sick-rooms should be kept at an equable temperature. The temperature should be regulated by the use of a thermometer, which should be hung in a position away from the greatest heat or cold, and not in a draught. It should be hung in the middle of the room, just above the level of the heads of the persons in the room.

The temperature of the room, as a rule, should remain about 56° F., but in the case of an infant, elderly, or collapsed patient, and some chest diseases, etc., it is well to keep the temperature about 60° F.

Never allow the temperature to vary, for instance, at one time 50° F., and at another time 60° F.

If the temperature of the room is taken four-hourly and charted and remedied accordingly, the results will be satisfactory.

N.B.—To obtain perfect ventilation, it is not only necessary that the heating be well regulated, and the supply of air constantly changed, but the air be kept, as far as is possible, free from contamination.

To this end every effort must be made to keep patients and whatever relates to them perfectly clean.

Bath the patient frequently; change the bedclothes often; keep bedpans enveloped in a heavy cover while being carried away from the patient, and deodorized after an offensive stool. Bedpans, urinals, douche-cans, and sputum-cups must be kept spotless. These should be washed with hot water after use, scalded and disinfected daily.

A disinfectant must be kept at the bottom of all sputum-cups, which cannot be burnt, and they should be emptied, scalded, washed, and sterilized at least twice daily.

Sinks, hoppers, and W.C.'s must be flushed, washed, and disinfected constantly. Avoid accumulation of trash and soiled dressings and other garbage. Report defective plumbing.

Beds and bedding.—A convenient bed for nursing the sick is one which is twenty-four to twenty-six inches in height, six feet six inches in length, and thirty-six inches in width. It is very difficult to move and lift a patient in a full-sized, or a three-quarter-sized bed, and it is not always possible to provide a double bed with sheets sufficiently wide enough to be tucked in far enough under the mattress to prevent wrinkles in the sheets.

The modern bedstead consists of an iron framework of the above dimensions. To its inner sides are attached springs and a latticed double wire mattress. A canvas or crash cover fits over the wire mattress, fastened with tapes to the hooks securing the springs. This protects the hair mattress in the event of rusting of the wire mattress.

Over the canvas cover is placed a hair mattress, the same size as the framework.

The hair mattress should be covered, not by the under-blanket, which is conducive to bedsores, but, by a well-fitting case made of stout calico, with buttoned ends, which must be changed and washed frequently. By this method there is no risk of wrinkles or heat under the bottom sheet.

To turn a mattress when making a bed, turn it over top to bottom—not over from side to side. The bedstead must be disinfected every week, also after the discharge or death of a patient.

The mattress, like the bedstead, must also be disinfected after the discharge or death of a patient.

When the patient has had an infectious or septic condition, the mattress must be either baked or exposed to disinfectant fumes.

To disinfect a mattress in the ordinary way.—Protect the floor with a mackintosh, or brown paper; bring the disinfectant to the bedside in a bowl, dip the brush or whisk into it frequently, whisk vigorously, paying particular attention to all seams and tuftings. Dry in the open air and sunshine.

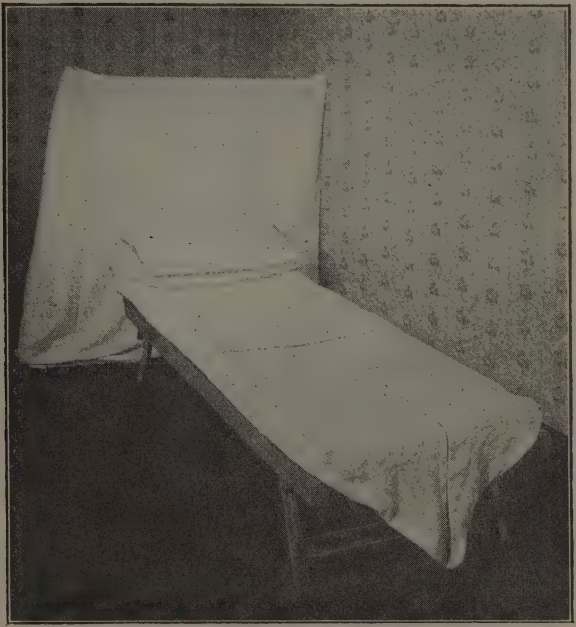


FIG. 2.—Showing bottom sheet tucked in; points made ready to be tucked under mattress.

The same kind of solution is used for the bedstead.

To make up the bed.—Cover the mattress with a sheet which should be large enough to allow of being firmly tucked under the mattress all round.

To ensure its tautness, tuck it in on one side, then pull it tightly across the mattress before tucking it in on the other side. To ensure neat corners, tuck in the ends, top and bottom, by the method of raising the hem, from the middle, over the mattress, which forms two points, as illustrated. Tuck in the lower point under the mattress; bring down the upper point, tuck it in under the mattress. This forms the "envelope pattern" as illustrated.

In case of a patient perspiring a great deal—fever patient, helpless and incontinent cases—a mackintosh must be placed over the bottom sheet.

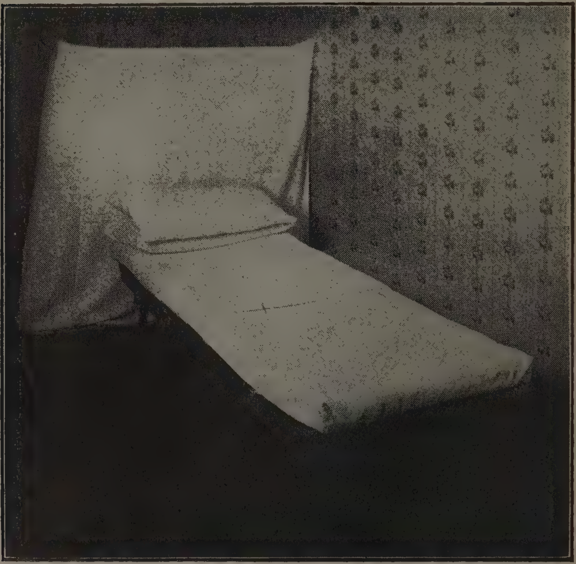


Fig. 3.—Showing bottom sheet complete. Envelope pattern.

As a mackintosh tends to help in producing bed-sores and tenderness of the skin, it should not be used unless it is a necessity. In the former cases the mackintosh should be large enough to extend from halfway under the pillows down to below the knees. In the latter cases it should extend the whole length of the bed, and, in the event of two mackintoshes having to be used, the lower edge of the one on the upper part of the bed should fit *over* at least 4 in. of the upper edge of the other mackintosh.

All mackintoshes should be wide enough to tuck well under the mattress on both sides.

Cover the mackintosh, whatever length, by a draw-sheet, made of twill sheeting, two-fold, and, in the case of the short mackintosh, it should extend quite 2 in. above the upper edge, and below the lower edge of the mackintosh, and should be wide enough to tuck well in on both sides, also additional width allowed for the object of a draw-sheet, which is to draw through two or three times daily from the one side to the other, thus making a clean, dry, cool place to lie upon. The same care should be taken as regards the tautness of the mackintosh and draw-sheet, as in the case of the bottom sheet.

Shake up the pillows—one hard and one soft one; push their corners well into the corners of the pillow cases, place them on the bed with their taped or buttoned ends away from the entrance to the room. Put on the top sheet in the same general manner as the bottom sheet, but with the hem wrong side up so that the right side may be uppermost when the sheet is turned down at the top over the blankets and spread. At the bottom of the bed the sheet may be turned back over itself to keep it clean, and then it can be reversed and placed at the top, but this is rather objectionable; it is not nice for that part of the sheet which has been round the feet to be put under the chin of the patient, yet it is economical. Allow the upper end of the sheet to come level with the edge of the mattress. Tuck it in at the sides, allowing the sheet a little slack across the bed. The bed may be made up with two blankets. Tuck the first blanket in on the sides only after folding it back over itself at the bottom about 6 in. If any extra length at the top, turn it back under itself. Avoid too much weight on the chest. Fold the sides of the second blanket under the body of the blanket, taking care that the edge of the fold is on a line with the edge of the mattress, and tuck in under the mattress at the bottom. Place the upper edge of the spread on a line with the edge of the mattress at the top, or fold in extra length so as to be level with the top of the blankets. Tuck in at the bottom. Fold the corners like an envelope and tuck in the fold, as illustrated, allowing the sides to hang down.

This arrangement discards the hangings at the bottom of the bed so avoiding dust, etc., being wafted under the bed, also allowing free circulation of air under the bed.

Abdominal bed.—After abdominal operations, or when there is an abdominal wound, the bed should be made up in the following manner:—

Over a bed-cradle place two blankets folded in half crosswise, their folds placed to the centre of the bed, one fold overlapping the other one.

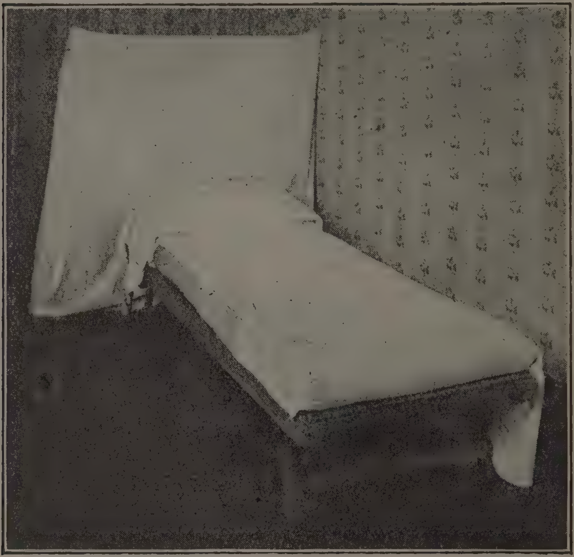


FIG. 4.—Spread tucked in at the bottom; sides folded over, point hanging, which must be tucked under the mattress. For completion, see Steam-tent.

In this way there is only the spread and the top sheet to remove, the folds to separate and raise, when treatment is given to the affected part.

Sheets may be used likewise, or a folded sheet at the upper end, and a folded blanket at the lower end.

Position of the bed.—The bed should be placed where the circulation of air is free, but not in a draught. In a private house, place it with the head against an *inside* wall, between the door and the window, yet out of the direct current of air from either the door or the window.

The arrangement differs according to the shape, etc., of the room.

In hospitals, the beds are arranged in rows, with the head of the bed placed to the outside wall, but the walls are double. In temporary hospitals, the head of the bed is placed to the middle of the room to obviate the risk of cold.

In a private house, very often a patient likes to have his bed parallel with the window. If so, place it about 2 ft. from the window, so that the patient can watch the progress of garden or trees. It is not advisable to have an outlook on to a busy street, as such may become a source of weariness.

Changing the position of the bed is a comfort to a patient, especially during convalescence, such as when the patient wishes to read or write.

Fracture bed.—The only difference between a fracture bed and an ordinary bed is that a perforated board, the size of the wire mattress, is placed between the wire mattress and the hair mattress. This is to prevent any motion at the point of fracture by the sinking of the mattress. The board or boards should be perforated to allow of ventilation.

Another kind of fracture bed is one that has an additional fine rail underneath the side rails of the bedstead, and fracture-boards as long as the width of the bed, 10 in. wide, with pieces of wood, 2 in. wide, at each end on the under surface forming a ledge, slide on the fine rails, and can be fixed in any position, or the whole length *under* the wire mattress. This arrangement allows removal for dusting purposes.

Steam-tent, or croup-tent.—Frequently used in cases of croup, and may be used in giving steam-inhalations or providing warm, moist air in diseases of the respiratory organs. It is sufficient to make a canopy for the upper portion of the bed, instead of enclosing the whole bed, in which latter case the air inside the tent becomes vitiated and tends to do more harm than good, since the warm moist air admitted is to facilitate breathing—unless a space is left to admit air.

To make such a tent.—A framework can be made by the use of clothes' horses or screens—three leaves, or four leaves, according to the size of the bed, arranged so that one leaf fits on each side at the top part of the bed, and the others at the back of the bed; four broom sticks will improvise, fixed in the following manner:—

Tie one stick at each upper corner, raised 2 ft. above the bed-rail, tie, or fix with drawing pins a broad bandage from stick to stick, stretching it tightly. Then tie one stick on either side-rail, 3 ft. from the top rail, fix with bandage as above, stretching alternately from one stick to the other, both at the bottom ends *under* the bed, and at the top ends *over* the bed. Then fix bandages, alternately from the right-hand *side* stick to the left-hand *top* stick, and vice versa. This will complete the framework. Cane or bamboo sticks may be used. A large bed-cradle stood on end can be used for the framework of the tent. In an emergency an umbrella can be

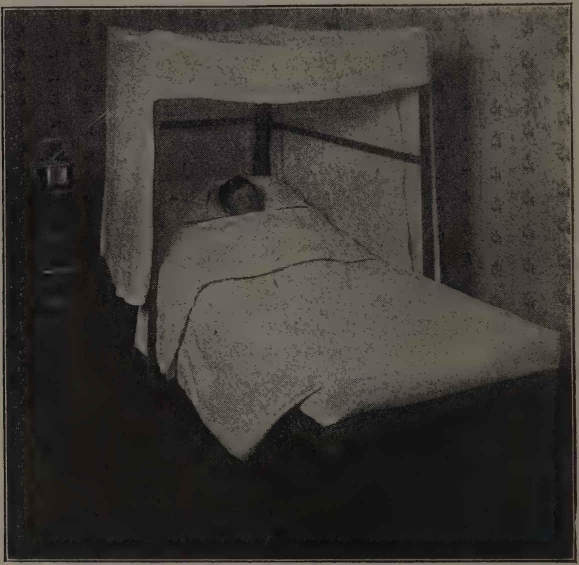


Fig. 5.—Steam-tent, showing steam introduced at the back. Sheet hanging down half-depth in front to show framework of tent.

tied to the head of the bed and a sheet thrown over it in such a manner that the sides and back will be walled in.

If the steam has to be introduced at the back, or at the side of the bed—either being very successful—stretch two sheets, right sides together, pin them down the centre, putting the pins quite near each other, and fold each sheet over upon itself in order to form a seam, and put a piece of old blanket under the portion of the sheets which is to form the top of the canopy.

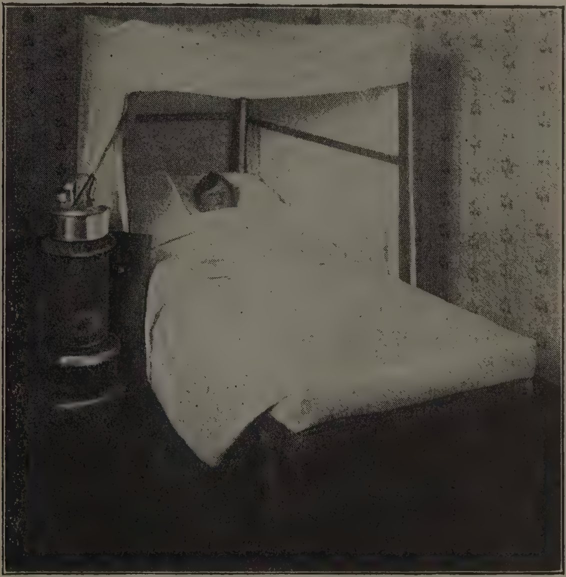


Fig. 6.—Steam-tent, showing steam introduced at the side. Sheet hanging down half-depth in front to show framework of tent.

This is to absorb the moisture from the steam. Place the sheets, as arranged above, over the framework from behind, allowing them to hang about a foot in front, and at least to the line of the mattress behind. Fold the excess width from the back around the sides, and pin in different parts to the bandage, also secure at the corners with strong drawing-pins to the sticks or screen. Then fold up the sides of the front and pin them in place.

If the steam is to be introduced at the back, put the spout of the kettle through an aperture which can be made by removing a pin or two in the seam. The spout of the kettle must be at least 2 ft. above the patient, and *not* directly over the patient's head. So in order to avoid this, either arrange the position of the patient, or the seam of the sheets, to one side of the bed.

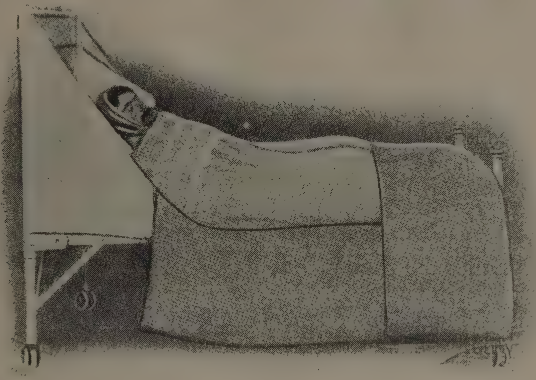
If a bronchitis or steam-kettle cannot be procured, a tin or enamel kettle placed over a spirit lamp may be used. A piece of stiff brown paper rolled up to form a tube, or a bamboo curtain pole which is hollow, is fixed to the spout of the kettle. The kettle and spirit lamp must be placed on a stool or chair at a height that will bring the current of steam from the spout to the required level. See that the spirit or other lamp is not too near the linen of the bed—the latter should be protected—and that the position of the kettle and lamp is secure to avoid serious accident. If the position of the bed can be arranged, the kettle may be placed on the fire, in which case a longer funnel will be required.

When using an ordinary kettle do not allow the water in it to be above the opening to the spout, or the steam will escape round the lid instead of through the tube. The water should boil quickly all the time to provide sufficient steam. Always have a second kettle of water boiling in readiness to replenish that by the bed, because if cold water is put into the kettle it will stop the current of steam to the bed.

If eucalyptus or other drug is ordered, it should be put into the kettle in the proportions advised. Change the sheets and blanket of the canopy when slightly damp. When the steam treatment is discontinued, remove the kettle and lamp, but leave the tent for a day or two, so that the patient may become gradually accustomed to the change.

Open-air treatment bed.—For use in tuberculosis, etc. Several blankets can be used for the extra warmth by the following method without incommoding the patient by their weight. The blankets should be properly rolled so that the mackintosh and drawsheet will not wrinkle under the patient.

To make the bed.—Cover the mattress with a sheet, which tuck in, in the usual manner, and cover with a large army blanket, or two ordinary sized blankets sewed together. Put on the ordinary mackintosh and drawsheet. Don't tuck any of these in. Cover the patient with the usual bed-covers, omitting the spread; roll the ends of these covers together



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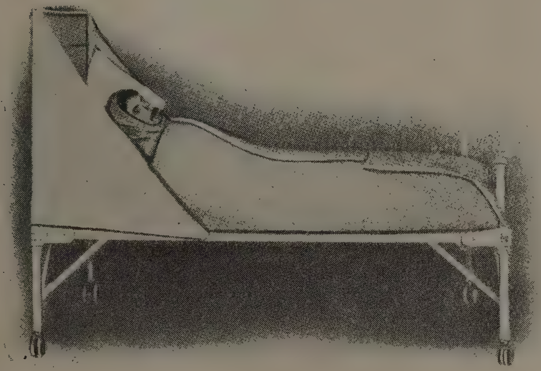

Fully adjusted.

FIG. 7.—Open-air treatment bed.

with mackintosh and drawsheet, *tightly*, close to the patient on either side and at his feet.

Bring up the ends of the army blanket, and, unless it is large enough to tuck far under the patient, pin it around him ; *fasten it securely at the feet and shoulders.* Put on as many extra blankets as are required for warmth, tucking them under the mattress. Lay a dressing-towel or sheet across the patient's chest to protect his face from the blankets. Use at least three pillows.

Place one of the pillows slantwise on either side of the patient, in such a way that they will protect his neck and shoulders. The third should be laid across the upper corner of these, under the patient's head. A soft hood with a cape which will extend over the shoulders is sometimes an advantage ; also in some cases flannel night-gowns and sheets.

In very cold weather the joined blankets can be put under, instead of over, the mattress and brought up around the patient, as illustrated.

When possible the mackintosh under the drawsheet may be omitted, but if placed under the mattress it will be a still further protection against the entrance of cold.

In windy weather a piece of stout canvas with eyelet holes at the corners to permit its being tied to the bed will make an effective screen, as illustrated.

The patient should be wrapped up before he is taken into the cold air and should be brought under cover whenever it is necessary to do anything which will entail loosening the covers.

CHAPTER II.

CARE OF THE PATIENT ON ADMISSION AND DURING ILLNESS.

Care and comfort of the patient.—It should never be forgotten that the care of the patient begins the moment he enters the ward. A warm reception goes far towards reassuring those who have fears regarding entrance to the wards.

If very ill he should be laid at once upon an open bed which has been protected by an extra mackintosh and a bath-blanket, the upper bed-clothes turned over one side, lengthwise, one by one. Screens should be placed round the bed. If he walks to the ward, place him far enough away from the door to escape draughts, and to be out of the way of those passing. If, in either case, the condition becomes suddenly worse, notify the doctor at once. If the extremities of the body are cold, apply hot-water bottles and extra blankets.

Take temperature, pulse, and respiration as soon as he is admitted, and again in two hours' time, after he has had time to rest. Unless the patient's condition counter-indicates, a bath is always given him. If the temperature is above 99° F. or below 96° F., his pulse weak or irregular, or if he gives any history of present bronchitis, pleurisy, influenza, or other lung disease, or shows blueness of face and extremities, weakness, or has wounds, or is wearing splints, the bath must be given in bed, which is called a blanket-bath.

When undressing a patient, note his general appearance, fat or thin, any œdema (dropsy), or loss of flesh, whether poorly or well nourished, any rash, or evidence of scratching (pediculi). Note any signs of discharge, wounds, ulcers, slight abrasions, swellings, growths, loss of motion in limbs, etc., or any of the special senses.

Care of the clothes.—Make a package of all contents of the pockets, writing on the wrapper name, name of ward, nurse, also date, contents, etc.

Examine the clothes for vermin, in seams and gathers. If found, fold neatly and see that they are fumigated. Fix a wrapper as in the case of the contents of pockets. Avoid mental discomforts by remembering the following suggestions :—

Notice when a light worries a patient, or when he is in a draught. Endeavour to remember his likes and dislikes, especially regarding food; never take longer than is absolutely necessary to fulfil a patient's request, especially when he has asked for a drink or a bed-pan. Never whisper in or near a sick-room, or the bed of a patient about whom you are speaking, not even if he is apparently unconscious or asleep. Never discuss a patient's condition with him. Never lean or sit on a patient's bed, and be careful not to knock against it. Never rock in a sick-room. Keep door and window hinges well oiled, and never allow doors and windows to bang.

There are many devices to relieve bodily discomfort, such as: pulling the drawsheet partially through under the patient, so that he will have a cool place to lie on; changing the position of the pillows as soon as they become disordered and uncomfortable. Small pillows, hot-water bags partially filled with warm water, or small pads placed in the hollow of the back, will often relieve local pain; a folded pillow tied firmly together, placed under the knees, will relax the strain on the abdominal muscles. Patients with difficult breathing are obliged to sit up in bed continually, and are often more comfortable if they have something on which to lean forward. To such, give a bed-table with one or more pillows on it. If a bed-table is not available, a board the length of the width of the bed, fixed so as to be supported on a pile of magazines tied firmly together and fixed on either side of the bed, or supported on pieces of wood tied to the side rail, will answer the purpose. In such cases make a foot-rest as in case of patient "sitting up in bed": see page 29.

When there is inflammation in an extremity, relief can often be given by elevating the affected part on pillows, remembering that an extremity thus elevated must be supported its entire length, and the elevation must be gradual. When the extremity is raised, less blood is sent to the affected part, and the swelling and pain is thus lessened.

When the weight of the bedclothes causes discomfort to any part of the body, a bed-cradle should be used to support them. Bed-cradles are made in the form of an arch, and when a proper one is not available, improvise in the following manner:—

A pillow placed on either side of the patient will help to raise the bedclothes. An old-fashioned kitchen-stool may be used in the case of a limb, the limb placed through between the legs of the stool, which latter should be protected by padding with wool. The bottom can be taken out, and a pigeon-hole made on two sides of a wooden box, or cardboard bonnet-box, to place over a limb. The leg lies through the pigeon-holes. Take a clothes-line and tie it round the bed-post at the bottom right-hand corner, carry it to the bed-post at the top left-hand corner, and vice versa. In this way it forms a tent. Intervening sticks or poles may be fixed to side rails between the top and bottom rails and the line fixed from pole to pole. This will raise the bedclothes more in the middle of the bed. The bedclothes may be tucked in according to the height of the cradle.

To give and remove a bed-pan.—Put a screen round the bed. First flex the knees, so that the feet will rest firmly on the bed, then pass one hand under the lower part of the back and raise him as you insert the pan with the other. Raise him in the same way, before attempting to remove the bed-pan.

If the pan is cold, it must be warmed before being given to the patient. After use, remove the pan, cover by the lid, also a mackintosh or thick washable material, and carry it away from the room.

Care of the patient's mouth.—The mouth of a fever patient on liquid diet should be washed after every feed. Improper care may result not only in ulceration of it and the tongue, but also in infection of the ears and glands. To cleanse the mouth, use several pieces of gauze, or absorbent lint or cotton, $2\frac{1}{2}$ in. square. The same piece must never be dipped in the mouthwash twice. There are several mouthwash lotions:—

Equal parts of lemon juice and soda water.
,, ,, ,, ,, ,, ,, glycerine.
,, ,, ,, boracic lotion and glycerine.
,, ,, ,, ,, ,, ,, lemon juice.

Do not use too much glycerine if the mouth is very dry;

owing to its properties of extracting fluid from the tissues, it increases the dryness of the mouth.

To cleanse the mouth, wrap a piece of gauze, lint, or linen round a pair of dressing-forceps, or substitute the latter by using a clean piece of whalebone. Wet the piece of linen in the mouth lotion, and clean every part of the mouth thoroughly. Be particularly careful of the tongue, cleansing all round the edges, underneath and on the top of the tongue, also the lining of the cheeks, the gums; in front, at the back and between the teeth, and on their cutting surfaces. Also the roof of the mouth.

If the lips are dry and sore, apply a little boracic ointment as lubricant.

Preparing the patient for the night.—Wash the face, hands and arms, arm-pits and back, with hot water and soap. Rub the back with spirit lotion and dust it with powder. Freshen his bed by shaking and turning the pillows. Draw a portion of the drawsheet through in order to give him a cool new position to lie on, sweeping out the crumbs with the hand, and straighten the upper bedclothes, also the under sheet and mackintosh.

Before going off duty at night see that no soiled clothes or garbage are left in the lavatories and pantries respectively, and that there is on hand a plentiful supply of all necessaries, medicines, dressings, solutions, milk, food, etc., for the night-nurse.

Care of patient at night.—Patients should have every opportunity to get to sleep early; lights turned down and the room quiet at an early hour.

Anæmia of the brain is one of the pre-requisites to sleep. Hot-water bottles at the feet; hot drinks, particularly hot milk; gentle friction of the forehead, or of the back of the neck are a few of the many means of bringing about this condition. In hot weather, or when the patient is suffering from high fever, moving him to the side of the bed, rubbing him with spirit lotion, and gently fanning the bedclothes will prove refreshing.

A night-nurse should be constantly watchful. Patients are always likely to be worse at night, and sudden changes take place then more frequently than in the daytime. As night advances, air grows colder, and patients' vitality becomes lowered. Give extra warmth toward morning, not only to those who complain of cold, but to all those whose lowered condition makes extra warmth advisable.

Her early morning work is very much the same as her evening work, but it involves, in addition, the washing of the patient and the arrangement of the hair, cleansing of the teeth and mouth, and various treatments and general comfort of the patient.

Her report should be clear and concise, recording all the significant symptoms and all changes in the patient's condition.

Care after death.—As soon as the person has stopped breathing, straighten the body and extremities after removing the gown, etc. Close the eyes, covering them with wet pads of wool. Place a support under the chin to hold the jaw in position—a pillow may be used—or apply a jaw bandage as described in Chapter IX. Cover the body with a sheet.

After an hour has elapsed, wash the body with hot water and soap, adding plenty of carbolic—1 in 20—to the water. Comb the hair; if a woman, braid the hair; cleanse the teeth, cut the nails.

Then plug the orifices with cotton wool, including the intestines, using dressing forceps or whalebone to insert the wool. Fasten a triangular binder, with a large oakum or tow pad, 25 in. square, in the centre, round the loins like a child's diaper. Put on the shroud after dressing any wounds, and tieing the knees and ankles in position. Perhaps the relatives will require a special night-dress to be put on the body instead of the shroud.

Any false teeth to be removed should be taken out soon after death. All valuables should be collected and specified as in case of admission of a patient. Give notice of death to relatives immediately it occurs.

The nurse need hardly be reminded of the sacred duty intrusted to her in the laying-out of the dead. She should bring to bear on her task such reverence, gentleness, and care as she would evince were she performing this duty for one of her own relatives.

To make a bed with a patient in it.—Before starting to make a bed with a patient in it, see that everything necessary is at hand, and that there are no draughts. Place a screen round the bed. (1) Loosen the bedclothes on all sides. As you draw out the clothes with one hand, raise the mattress with the other, to avoid jarring the patient, and tearing the clothes. (2) Take the pillows out, one by one, and shake them—not over the patient. If the patient does not object to being without one, leave it to air for a few minutes whilst proceeding to make the bed. (3) Take off the spread, and if there are two blankets, remove the upper one. Then, whilst holding the blanket left on, roll the top sheet downwards *under* the blanket to the bottom. This leaves the lower blanket next to the patient to retain the heat. (4) Fold the lower blanket up over the patient at the sides, leaving it just wide enough to cover him when he is turned. This answers a three-fold purpose: (*a*) neat appearance; (*b*) clothes not in the nurse's way; (*c*) replaces the discarded blanket. (5) Change the bed-gown, if soiled; if not, brush all crumbs out of it. (6) Change the under sheets, if necessary; if not, tighten the under sheet and mackintosh, and pull the drawsheet partly through, that the patient may have a fresh, cool place to lie on. (7) Wash, dry, and rub the back and all parts in contact with the bed, with spirit lotion, and powder same. (8) Sweep all crumbs from the bed, always using the hand, under the patient, since only with it will all crumbs be discovered. (9) Now place the top sheet over the lower blanket on the patient. Pass the blanket, rolling downwards, *under* the sheet, to the bottom of the bed. Then place carefully, and without causing a draught, over the sheet. (10) Tuck in the top sheet and blanket, being careful to keep them loose at the bottom over the patient's feet. (If the weight of the bedclothes on the feet is uncomfortable, put a bed-cradle over the feet under the blanket *over* the sheet.) Put on the upper blanket and tuck in. (11) Put on the spread. Tuck it in at the foot as when making a closed bed, but, if this is the early morning duty, fold the spread back underneath itself at the top and bottom, placing the sheet over it at the top. (12) Replace and arrange the pillows, and make the patient's position in bed comfortable. The details should be carried out in this order, since crumbs may be introduced into the bed by changing the bed-gown, pillows, and upper bedclothes after the lower sheet.

To change the pillows.—Slip one arm under the patient's head and far shoulder, raise him slightly, and, with your free hand, remove the pillows one at a time, pulling them outward. Before replacing the pillows, shake them, and see that the corners of the pillows fit into those of the cases. To replace the pillows put them within easy reach at the head of the bed, on the far side; raise the patient as when removing them; pass the free hand at back of the patient, and draw the pillows into place.

To change the bed-gown.—Air the clean gown. When the gown is a closed one at the back—opening in front—have the patient lying on his back with his knees flexed. If he is strong enough, have him slightly raise his thighs; if not, place one of your hands under the buttocks and raise him, while you draw the soiled gown up with the other hand. Then slip one arm under his shoulder, and, supporting his head with that arm, gather the gown from the bottom to its collar-band into your hand, bringing it well up around his neck. Now, remove one sleeve of the gown to be discarded, and put on the corresponding sleeve of the clean one by passing your hand through it, or gather the length of the sleeve from wristband to armhole, making about two inches to pass over hand and arm, grasping the patient's hand and drawing the sleeve over the arm. Slip the clean gown across the chest under the soiled gown, thus preventing exposure, and proceed with the second sleeve as with the first one. Then gather up into the hand the back of the clean gown; pass it over the head as in the case of the soiled one. Gently pass down under the shoulders and back. Raise the hips and thighs and place the bed-gown, without creases, under the buttocks.

To change the under sheet.—Prepare as for "making the bed"—blanket on top—screen round the bed. If the patient is fairly strong, turn him on his side, face towards you; roll the under sheet lengthwise to half its width, also the mackintosh and drawsheet. Then lay the fresh sheet, previously rolled in like manner, on the mattress, the rolled part touching the rolled part of the soiled one. Tuck its free end as far under the edge of the mattress as possible. Be sure that the sheet is perfectly straight, and that the roll does not face the bed. Now, unroll the mackintosh and tuck it tightly under the edge of the mattress. Treat the drawsheet in the same manner as the mackintosh. Then turn the patient on to the clean sheet covered by the drawsheet and mackintosh, then on his other side. Take off the soiled sheet, place it in a bowl or receiver —not on the floor—stretch the clean sheet and tuck in tightly; the mackintosh, and drawsheet too, till they are absolutely free from wrinkles. Tuck them in firmly, separately, under the mattress.

The soiled drawsheet is removed and replaced by a clean one by the same method.

See illustration, "Changing a drawsheet".

When the patient is too ill to be either moved or turned, it is often easier to change the sheets by working them from the top to the bottom of the bed, in which case help should be procured to raise the patient where required. Loosen the soiled sheet on all sides, draw it down to the nape of the neck; roll the fresh one, commencing at the top; place it on the bed, and tuck its top edge under the mattress in order to keep it in its place. Then draw down both sheets together, slipping hands under the patient, and raising him as required.

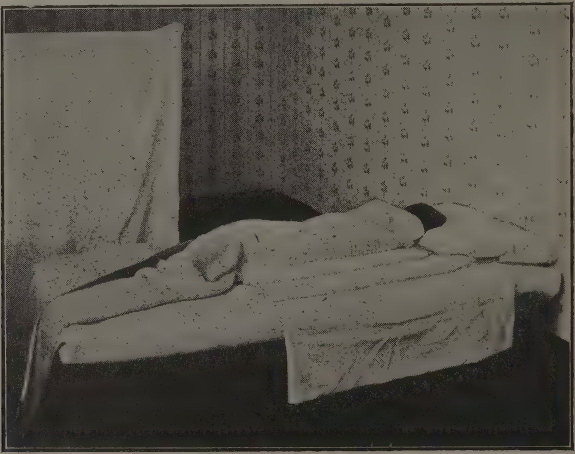

Fig. 8.—Changing a drawsheet. Showing method of placing the blanket which serves a threefold purpose, as explained.

To turn or change mattress with patient in bed.—Remove the spread and upper blanket and top sheet as when "making a bed with a patient in it," and leave the lower blanket covering him. Unfasten the lower sheets and roll them tightly (roll side upward) till the rolls touch the patient on each side. Take hold of one roll close to the head and feet: have an assistant to do likewise on the other side and lift in unison the patient from the bed, whilst a third person pulls out the mattress from the foot of the bed, turns and replaces it. Then lay the patient down, and tuck in the clothes. If the patient is very heavy, four persons will be needed to lift him, and a fifth to pull out the mattress.

To exchange one hair mattress for another one—in case the latter part of the process described above is not practicable. Lift the patient, after sheets have been rolled up to him, to one side of the mattress. Draw the mattress half-way off the bed in the opposite direction to that in which you moved the patient. Then pull the new mattress up to it. Then lift the patient on to the new mattress; withdraw the old one, and draw the new one into position, supporting the patient. Now lift the patient into the centre of his new mattress, unroll sheets and tuck them firmly under it. A mattress may also be turned in much the same way if pillows are provided and placed on the bedstead for the patient to lie on during the process. This last method disturbs the patient more than the first one, but it can be practised with one assistant. In fact, if the patient is light, or able to help himself, one person can easily do it alone.

To remove a patient from one bed to another.—It is possible to do this by placing the beds with their *sides* close together, but this necessitates the awkwardness of one assistant having to get over one bed to follow the patient to his new bed. If there is room enough, it is best to place the head of the empty bed at the foot of the bed the patient is in.

Then remove the spread, upper blanket and top sheet, leaving the lower blanket over the patient. Then two or four assistants raise the patient in the drawsheet, as stated before, which has been previously rolled up to his sides, and lift him, in unison, over the foot of his bed and over the head of the empty bed, and then place in position on the bed prepared by the under sheet, mackintosh, etc., as usual.

To lift and carry.—In all cases of lifting, the nurse's back should be bent as little as possible. Make the knees do the bending, and, when two or more are lifting they should lift in unison, which is important for the comfort of the patient. To lift a patient while he is in a sitting position, place your arm over his shoulder, taking a firm hold under his opposite armpit; have him clasp his hands on *your* far shoulder; place your free arm under his knees. This method, though not always the most convenient, throws the strain on the lifter's shoulders which can stand it much better than the back. If two persons undertake to lift and carry, they should grasp each other's forearm under the patient's shoulders at the back, and each other's hands under the patient's thighs.

To lift a patient up in bed.—Sometimes a patient slips too far down in bed, and needs to be drawn up.

Flex the knees so that his feet will rest firmly on the bed; grasp him under his far arm, placing your arm so that his head will rest in your elbow joint. Put your other arm under his thighs; bend your knees slightly to avoid bending the back and move him gently upward. If he is so heavy that it requires two nurses to move him they should stand on opposite sides of the bed. Proceedure: One should grasp him under the arm, as if she were to move him alone, then place her other arm under the small of his back; the other nurse should also place one arm under the small of his back beside her companion's arm, and the other arm under his thighs. Then lift in unison. Straighten the drawsheet and mackintosh after lifting the patient and re-arrange his pillows.

To sit a patient up in bed.—A back-rest is helpful. Substitute one by using a chair, placing it with the front part of it resting on the bed—in a sloping manner—behind the patient who is sitting up in bed. The legs of the chair should be touching or through the bed-rail at the head of the bed, and the top of the chair back resting near the bottom of the patient's back. Protect the chair back at the bottom end by a pillow placed across it on the bed. Then place two pillows in position as the letter "V" upside down. Then repeat the "V" shape, taking each set of pillows higher and further back until at a level with the patient's shoulders. Then finish by placing another pillow *across* the top for the patient's head to rest. In this way the patient has a comfortable "armchair" position with rests for his elbows. When in this position the patient flexes the knees, and then his legs and feet are uncomfortable. This can be remedied by making a foot-rest, also supporting the knees. Make a foot-rest by rolling one or two hot-water bottles in a drawsheet and securing the ends of the sheet to the bed-rail on either side by means of tape, or, carry the tape, and tie under the bedstead. It will not be firm enough if merely tucked under the mattress. Then put one, or two, pillows under the knees. A foot-rest may be improvised by placing a board, 6 in. wide and 3 ft. long, with two holes in each end, across the bed at a level where the patient's feet rest. Through the holes run pieces of rope long enough to tie to the head of the bed when the board is at his feet, placed on its edge. Pad the board, or place a pillow between it and his feet. A pillow placed in the same way will answer the purpose.

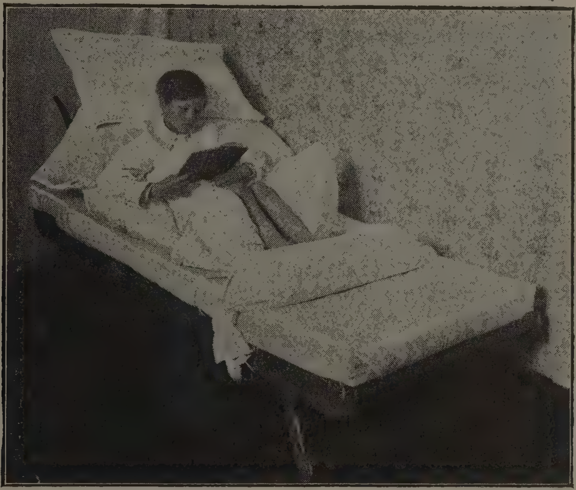

FIG. 9.—Patient sitting up in bed. Chair used as back-rest; pillow as knee-rest; hot-water bottles in drawsheet for foot-rest.

To get a patient up in a chair.—Use an armchair and proceed as follows: Place the chair at right angles with the bed; make it comfortable by putting pillows in the seat and at the back, and, if the patient is very thin, place a soft pillow over each arm of the chair. Put on a blanket cornerwise over the pillows; lift the patient in the manner already described into the chair. Wrap the blanket about him, leaving it rather loose around the arms, but tucking it snugly around the knees, legs and feet, and if necessary pin with a large safety-pin. If the patient has a hot-water bottle in his bed, place it on the floor under the blanket for a foot-rest. If not, put a pillow under his feet. Always put him a pair of stockings and slippers on, and see that he is not sitting in a draught. Count the pulse as soon as he is up, and again shortly afterwards.

After an illness of any severity a patient should seldom remain up longer than twenty or thirty minutes the first day, and even a shorter time if the pulse changes.

The bed- or blanket-bath.—See that the windows are closed and that the room or ward is sufficiently warm and devoid of draughts. Put a screen round the bed. Bring to the bedside everything required:—

A mackintosh to protect the bed; two large blankets and two towels previously warmed; a tray with bath-sponge, soap, nailbrush, hairbrush and comb; and, to expedite the work, have two bowls of water, temperature 110° F., one for soaping the sponge and the other for rinsing the sponge; a large can of water, temperature 112° F., under the bed, to keep up the temperature of the water in the bowls, because, as a rule, the patient objects to water grown nearly cold; hot-water bottle.

Remove the spread and upper blanket. Place one of the warmed blankets over the lower blanket. Remove the top sheet (as before described) from under the lower blanket, now change the places of the two blankets, i.e. put the warmed blanket next to him. See that the evening or morning temperature is taken before commencing, and when everything is ready:—

Roll up the mackintosh and the other warmed blanket lengthwise to half their width, as when about to change an under-sheet. Turn the patient on his side, with face towards you, keeping him well covered. Place the rolled blanket and mackintosh—together with the mackintosh next to the bed—well against his back. Turn him on to them. Then turn him on his opposite side and unroll the blanket and mackintosh to the edge of the bed. Now put the hot-water bottle against his feet between the two top blankets. Take off the bed-gown and proceed with the bath. Wash first the face and ears, afterwards the neck, shoulders, chest, arms, back, abdomen, legs and feet successively. In washing exert a firm but gentle pressure. Dry each part immediately. Wash and dry the ears, behind the ears, between the fingers and toes, armpits, the pubic region and groins particularly well. And, when about to wash the back, turn the patient *gently* over on his side, supporting the hips and shoulders. Rubbing the patient at the end of the bath with spirit lotion will further the drying process. Never expose the patient. The whole bath, except the face and arms, can be given *under* the blankets. The bath must not be considered finished until the toe- and finger-nails have been cleansed and pared. If the patient is exhausted after the bath, put another hot-water bottle at his feet and give him a hot drink. When the bath is finished, remove the bathing blanket from under the patient's top blanket. Turn him gently on his side, and roll up, close to his back, the under-blanket and mackintosh both together. When he is turned, lying on his back again, they may be easily pulled away at the other side of the bed. Put on a clean, warm bedgown. Make up the bed, keeping his lower blanket next to him—the top sheet between the two blankets for about two hours. Clear away all soiled sheets, the bowls, etc., from the bedside. Leave the hot-water bottle at his feet.

Washing the hair—patient in bed.—Have ready two bowls of water, temperature 110° F., and a third bowl of tepid water for rinsing the hair; two hot towels; soap; mackintosh. Prepare the bed by removing the pillow from under the patient's head, and placing under his shoulders. Enclose a mackintosh—covering it on both sides—in a drawsheet or towel. Place it around the neck of the patient so that it also covers the space where the pillow rested. Stand on the left side of the bed; place the bowl in the space where the pillow was; wet the hair and soap it well; rub the scalp and hair. Repeat this, using the second bowl of water. Then rinse with the tepid water. Dry the hair as well as possible with the hot towels. Examine the head for vermin and nits.

In the case of a new admission requiring a bed-bath, hair included, wash the head first, then proceed with the body and limbs. In this way the hair will be getting dry by the time the bath is finished.

Bath sponge.—To make a serviceable and economical sponge, knit a square, using No. 6 Strutt's white knitting cotton with No. 10 needles.

Cast on sixty stitches, and do plain knitting to form square. They can be boiled and still retain their newness.

Each patient should have his own sponge, and soap and towel, as also hairbrush and comb.

CHAPTER III.

TEMPERATURE OF THE BODY.

Temperature of the body.—No symptoms are more important than those which have to do with temperature, pulse and respiration. The organs controlling them are so closely connected that whatever affects one generally affects the other.

In health the body has a constant temperature, which is the result of two processes: (1) the production of heat by food and the mechanism of the body; (2) the aerating of the blood by vessels passing near the surface of the body, and the loss of warm substances passed in the form of waste matters, which takes place by the action of the lungs, kidneys, bowels and sweat-glands. And the balance between these two processes is controlled by the nervous system.

The normal temperature of the body is 98·4° F., but even this varies. It rises gradually from 7 to 8 a.m., until the same time in the evening. Its highest degree is reached between 5 and 8 p.m., its lowest degree between 2 and 6 a.m.

In infants, the temperature is higher than in adults, while in older people it is somewhat lower still. Certain conditions alter the temperature, viz. :—

Germs of disease, inflammation of any part of the body, digestion, excessive exercise, constipation, hæmorrhage on the brain, raise the temperature.

Excessive vomiting, profuse perspiration, diarrhœa, hæmorrhage, or shock will often lower the temperature, through prostration of the nervous system.

The degree of temperature compatible with recovery from disease depends considerably upon the disease. Patients have recovered from sunstroke after a temperature of 112° F. In pneumonia, 105° F. is a frequent temperature, but 104° F. is considered alarming in diphtheria.

There are different degrees of temperature, and these show that the body can stand a greater increase than a decrease of temperature, as shown by the table below. And it is far more difficult to try and recover a patient in a state of severe collapse than one with hyperpyrexia.

Hyperpyrexia (excessive fever) = 105° F. and over
High fever . . . . = 103° ,, to 105° F.
Moderate fever . . . = 101° ,, ,, 103° ,,
Sub-febrile state . . . = 99·6° ,, ,, 101° ,,
Sub-normal state . . . = 97° ,, ,, 96° ,,
Collapse . . . . = 96° ,, ,, 95° ,,
Severe collapse . . . = below 95° F.

The course or run of the temperature varies in different diseases.

In *Scarlet fever* it rises higher and higher for the first three days, reaching its height about the third or fourth day, when the patient is at his worst. It then begins to come down a degree or two each day, till by the end of the week it is normal again.

In *Diphtheria* the temperature is irregular in character. It produces no typical chart. Sometimes it rises to 103° F., but more often 101° F. or 102° F. marks its limit in the upward direction, while in some cases it is never above 100° F.

In *Measles* during the first three days there is only moderate fever, varying between 100° F. and 102° F. On the fourth day, with the appearance of the rash, it shoots up to 103° F. or 104° F. or even higher. After remaining up for about two days, there is a sudden fall to normal.

In *Broncho-pneumonia* the temperature is very irregular, whilst in *pneumonia* (lobar) the daily variations are slight; the temperature in the latter rising sharply at the commencement of illness to 104° F. or even higher. It remains up, with slight daily variations, for about a week, and then in the majority of cases falls abruptly to normal. It generally begins to fall on either the fifth, sixth or seventh day of the illness in a favourable case.

In *Typhus* the temperature rises rapidly and very high; more rapidly than in typhoid, and remains continuously high during the first week. In the second week its morning remissions are more marked, and on the thirteenth or fourteenth day it falls by crisis to normal. Death not uncommonly takes place at this period.

In *Smallpox* the temperature rises rapidly after the initial chill to 103° F. or 105° F., then remains high until the eruption appears. It then falls, remaining lower—99° F. to 101° F.—till the pustules form, when it gradually rises, reaching its height about the ninth day. In mild cases lysis then begins, but in severe cases the temperature will remain high for some days longer.

In a typical case of *Typhoid fever* the temperature rises gradually during the first week, till at the end of that time it has reached its height. It then remains up for about two weeks, falling a degree or two each morning, and rising again in the evening. Towards the end of the third week it gradually comes down again to normal.

Septic conditions.—The temperature varies according to its degree and whether localized or general.

The types of fever are as follows:—

1. Continuous—when the fever is constantly high with slight fluctuations, as in pneumonia.
2. Remittent—when the temperature remains above normal, but with a considerable range between its highest and lowest points, as in typhoid, tuberculosis, and wasting diseases.
3. Intermittent—when it alternately rises to a feverish height and falls to, or below, normal, as in malaria.

The temperature should be taken at the same time each day so as to get an accurate idea as to its real and true course; usually four-hourly, or morning and evening at stated times, and recorded on four-hourly and daily charts respectively.

How to take the temperature.—The clinical thermometer is the instrument to use. Trusting to touch by the hand is not by any means a true guide.

The temperature can be taken in the armpit, groin, mouth (under the tongue), bowel. In these places the large blood-vessels are near the surface of the body.

The clinical thermometer is a glass instrument, consisting of a bulb and a stem. The bulb is filled with mercury, and the stem has a very fine canal running up within it, which is a continuation of the bulb, and in this the mercury ascends when it is expanded in the bulb by the heat of the body, and at the point it reaches on the stem the graduated table on the stem tells the degree of heat. The common form is about 4 in. in length. The graduated table is marked in degrees by large transverse lines from 95° F. to 110° F. The arrow-point designates the normal temperature of the body, viz., 98·4 F. Each degree is divided by four smaller transverse lines to render the reading more accurate, and correspond to even numbers between one and ten. If the mercury runs to a level between the large transverse lines, the registration will be: the degree, point two, four, six or eight. For instance: 98 degrees, point two; written 98·2.

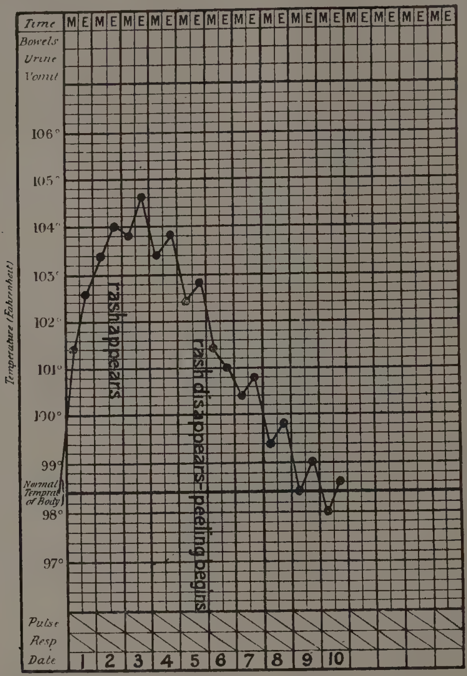

Chart 1.—Scarlet Fever.

Length of registration.—Good thermometers are usually marked the length required for registration. Cheaper grades require from three to five minutes.

In the mouth 3 to 5 minutes are required.
,, ,, rectum 1 ,, 3 ,, ,, ,,
,, ,, armpit 10 ,, 15 ,, ,, ,,

The rectum registers one-half degree higher than the mouth; the armpit registers from one to three-tenths of a degree lower than the mouth.

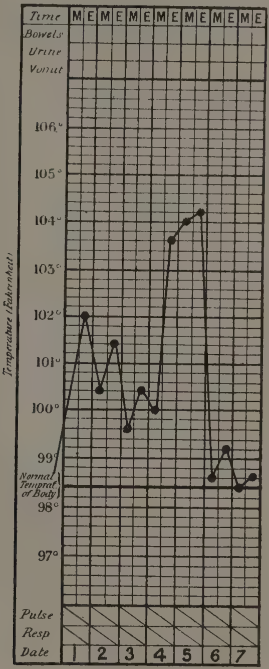

CHART 2.—Measles.

To read the thermometer, hold it horizontally, and read upwards from 98·4, or the bottom of the column. Before use the mercury in the column should be shaken down to 95° F.—not into the bulb—or the instrument will be rendered useless.

Keep thermometers in glasses containing antiseptic lotion. Small shrimp glasses may be used. Place a small pad of white absorbent wool in the bottom and soak it, and just cover it with carbolic lotion, 1 in 20. The pad of wool protects the bulb.

When taking the temperature in the *mouth*, be sure that the patient has not had anything hot or cold in the mouth recently. Place the end of the bulb under the tongue—on either side—close to the arteries. See that the lips are closed all the time the thermometer is in the mouth, and do not leave there longer than is necessary.

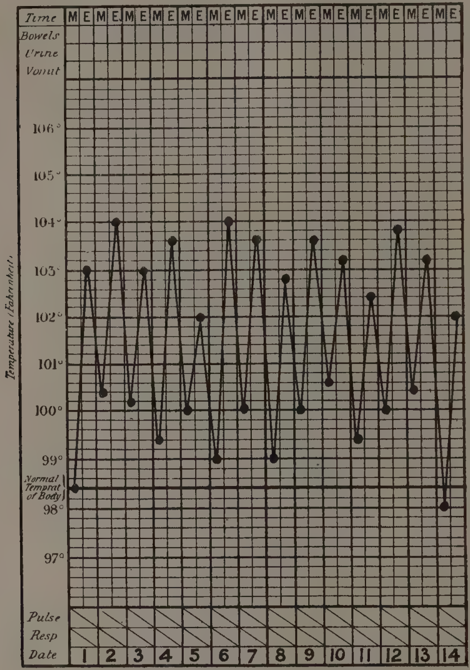

Chart 3.—Broncho-Pneumonia.

A convenient method is by the *armpit.* Be sure that the skin is dry. Insert the bulb obliquely and upwards well into the armpit. Place the arm well across the chest; the hand to grasp the opposite shoulder. The bulb should be in contact with the two folds of skin. If the patient is weak or thin the nurse should support the arm. Occasionally one may have a patient whose temperature is slightly higher on one side of the body than the other; in which case the temperature must be taken on both sides of the body, and the highest recorded.

In any case of serious illness it is advisable to take the temperature by the bowel; it being a closed cavity, it gives a greater degree of accuracy.

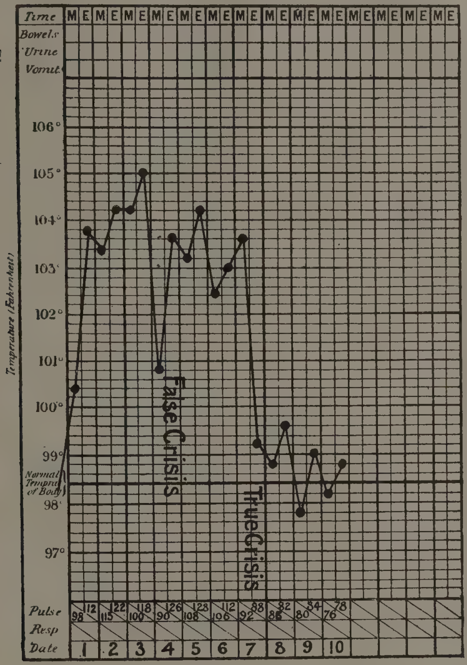

Chart 4.—Lobar Pneumonia.

Children's temperature can be taken in the groin by the same method as in the armpit. The thigh should be bent up on the abdomen after placing thermometer.

Description of method of inserting the thermometer into the bowel.—It is usually practised in the case of an infant.

Place the child face downwards across your knees. Grease the bulb and insert it into the rectum in a downward direction—taking care not to force it in when the muscle of the external opening contracts—wait a second until it relaxes, as in the case of inserting the enema-syringe nozzle—towards the child's navel, well inserting the stem up to 97° F. Allow to remain for five minutes, or until the mercury is noted to have been stationary for a few seconds. Remove it, record temperature, then thoroughly cleanse the thermometer.

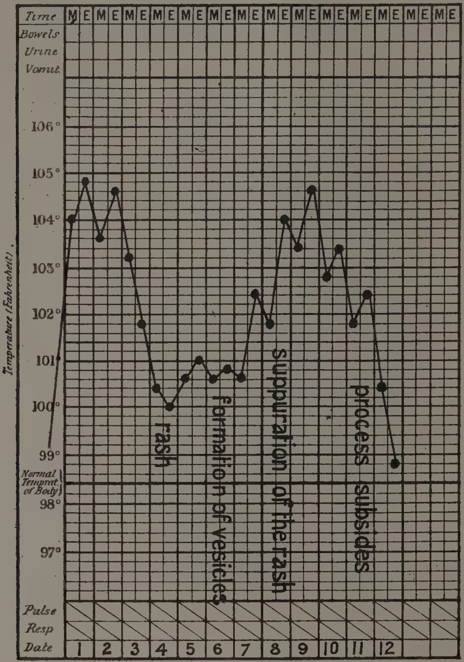

CHART 5.—Smallpox.

If an adult—turn him on his side, as for enema, and insert the bulb in like manner. See that the cavity is free from fæces.

If the bowel is diseased, the temperature should not be taken there. Never take the temperature of a young child, delirious or unconscious person, or a patient with difficult breathing, or diseased mouth, by the mouth.

In the case of the three former conditions there is a danger of the bulb being bitten off. It is safer to take it in the bowel or armpit.

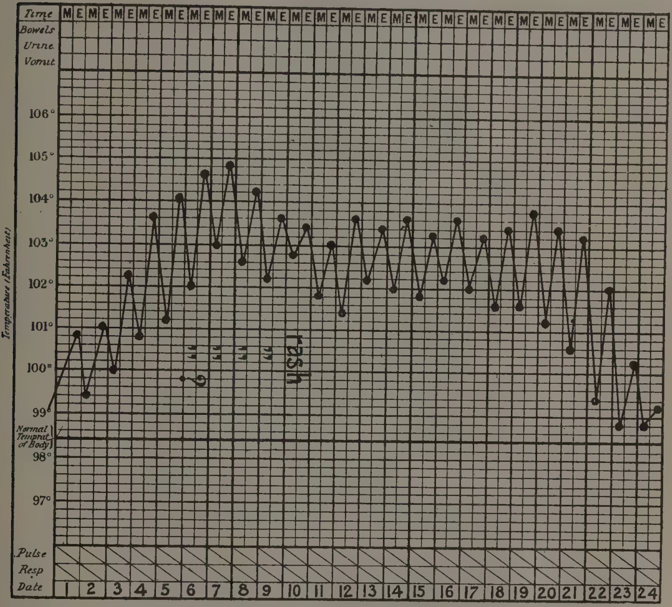

Chart 6.—Enteric.

In the latter condition infection may be carried and it would cause pain. Take the temperature in the armpit. The thermometer should be cleansed after each time it is used.

Signs and symptoms of fever.—The two chief points are: (1) rise of temperature; (2) increased waste of body tissues.

The general symptoms are: loss of appetite, diarrhœa or constipation, thirst, furred tongue, probably vomiting; increased pulse-rate, rapid or shallow breathing; hot, dry skin, or perspiration; anxious expression, pallor, or flushed face; rashes, if of infectious disease.

The fever may be ushered in by a rigor—an attack of continued shivering.

The pulse.—The pulse is the distension of the arteries by a wave of blood forced through them by the action of the heart. The arteries nearest the surface of the body give the pulsation, and can be readily counted at the radial artery, just above the wrist on the thumb side; the temple, the angle of the jaw, and in the groin.

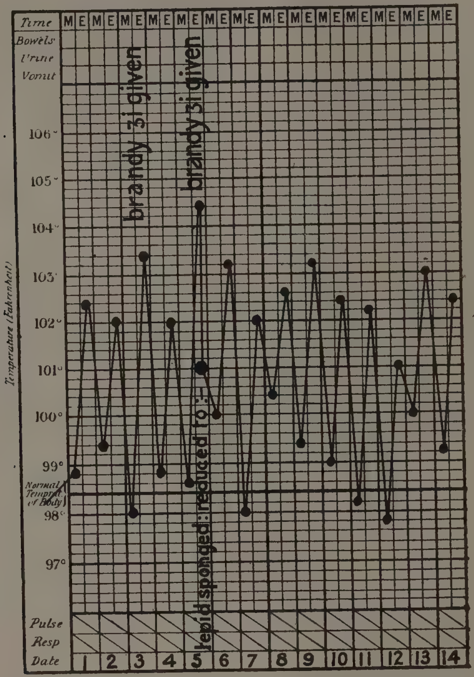

CHART 7.—Phthisis.

To count the pulse at the radial artery, place the index and middle fingers—three fingers—over the artery, as above stated, and make a slight pressure. When taking the pulse for the first time always take it in both wrists, to ascertain if it can be felt equally well in both places.

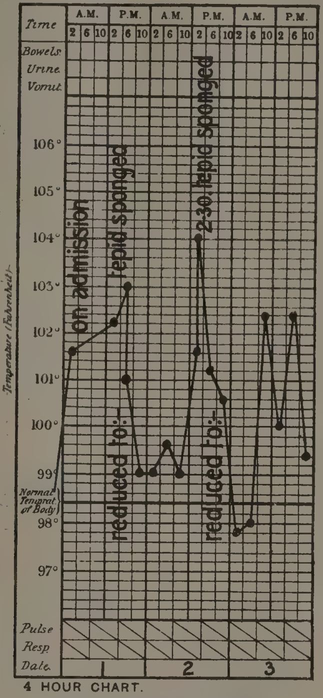

Chart 8.—Local Sepsis.

The average pulse is :—

Infants at birth . . .	130 to 160 per minute
,, older . . .	110 ,, 130 ,, ,,
Ages 1 to 7 years . .	80 ,, 120 ,, ,,
,, over 7 ,, . .	72 ,, 90 ,, ,,

Women differ in rate to men :—

Women	65 ,, 80 ,, ,,
Men	60 ,, 70 ,, ,,

Excitement, poisons of disease, sudden emotion, food, exercise, will alter the frequency of the pulse.

The pulse is classed according to its frequency, viz. :—

100 to 115 per minute is termed "frequent";
115 „ 140 „ „ „ „ "rapid";
over 140 „ „ „ „ "running".

There are other points to notice, viz. :—

Force—Feeble, sluggish, forcible or normal.

Volume—Full, large or small.

Rhythm—Regular, irregular, intermittent (pulse ceases at intervals); dicrotic (where there is a secondary weaker beat), indicating a relaxed condition of arteries, it often accompanies acute fevers—typhoid. The two beats represent only one contraction of the heart, so should be counted as one beat.

Compressibility.—When the pulse can be easily stopped by pressure.

Tension.—"High," when the artery is persistently full between beats, as in kidney disease. "Low," in weakened conditions.

REPORT SHEET.

Date 1910.	Time.	Nourishment.	Stimulants.	Med.	Sleep.	Treatment.
1 Nov.	8·30 a.m.	Milk ℥iv				
	9 „		Brandy ʒi			
	10 „	„ ℥iv	„ ʒi	ʒss		Foment. to hip.
	10-11·30 „				1½ hr.	
	11·30 „	„ ℥iv	„ ʒi			Foment. renewed.
	12 noon	„ ℥iv	„ ʒi			
	1 p.m.	„ ℥iv	„ ʒi			
	2 „	„ ℥iv	„ ʒi	ʒss		Foment. renewed.
	3 „		„ ʒi			
	3·30 „	„ ℥iv				Foment. renewed.
	4 „		„ ʒi			Tepid sponged. Temp. 105° F.
	4·30 „	„ ℥iv				
	5 „		„ ʒi			
	6 „		„ ʒi	ʒss		Foment. renewed.
	7 „	„ ℥iv	„ ʒi			
	8 „	„ ℥iv	„ ʒi			Foment. renewed.
	12 hr.	Milk Oii	Brandy ℥iss			

The other abnormal pulses—jerking, bounding, thready, wiry and flickering, are accurately and sufficiently described by their names.

In the recording of temperature, pulse and respiration, which are vital points in any disease, great care should be exercised. The exact degree, or part of a degree, of temperature, rate of pulse and respiration should be immediately filled in on the chart.

CHAPTER IV.

RESPIRATION.

Respiration is the act of breathing. The primary object of breathing is the purification of the blood, and this is accomplished by the exhalation of carbonic acid gas and other effete matter from combustion, and by the inhalation of oxygen.

Every respiration consists of two parts, viz.: (1) inspiration, (2) expiration, and in health the rhythm is regular.

The respiration and circulation are so intimately connected that anything affecting the blood will immediately cause a corresponding change in the respiration. The respirations are also quickened by abdominal or thoracic pain, and are diminished by narcotics, cerebral traumatism or disease.

The respiration being to a certain extent under the patient's control, it should be counted without his knowledge. To do this, count it while holding your fingers on his wrist as though taking the pulse. Watch the rise—inspiration, and fall—expiration, of the chest wall, and count:—

"An inspiration and expiration" as one. In men and children the respiration is deeper than in women. The normal rate of respiration is:—

16 to 18 per minute in adults;
20 ,, 24 ,, ,, ,, children;
24 ,, 30 ,, ,, ,, infants.

Respirations registering above forty, or below ten, are extremely dangerous. The normal ratio of the respiration to the pulse is "one to four".

Respiration varies in diseases. In pneumonia and bronchitis the expiration is lengthened; in inflammation of the windpipe and voice-box the expiration is shortened.

In men and children, respiration is more apparent abdominally; in women thoracic respiration is more apparent.

The abnormal respirations are: Cheyne-Stokes, dyspnœa, œdematous, stertorous, hiccoughs.

Cheyne-Stokes is common in brain, heart, and the typhoid state. There are two forms:—

(1) Respirations gradually increase in force and frequency up to a certain point, then as gradually decrease until they entirely cease, then increase again.

(2) Respirations gradually increase in force and frequency, likewise, but cease suddenly instead of decreasing gradually.

Dyspnœa.—Difficult breathing; the respirations are forced and laboured, and may be due to impaired circulation in consequence of which there is not a sufficient supply of blood oxygenated to provide the required supply of oxygen for the body. After hæmorrhage, for example, or increase in the heart-beat, obstruction in the air passages.

Orthopnœa is when dyspnœa is so bad that the patient is unable to breathe in a recumbent position.

Œdematous breathing is caused by the infiltration of serous fluid into the air cells of the lung. There is dyspnœa and loud rattling sounds of the fluid in the lung, mucus in the throat. This condition is serious and shows œdema of the lung.

Stertorous breathing is more common and less serious. It is characterized by a deep snoring sound in connexion with each inspiration. In hæmorrhage on the brain the breathing is such, and the cheeks are puffed out at each breath.

Hiccough.—It is caused by a sudden contraction of a large muscle which divides the chest from the abdomen. It is a sign of indigestion, and is of little import in health. But it is an adverse symptom in all abdominal diseases, especially when it persists after abdominal operations.

Definition of ailments.—Adenoids are overgrowths of adenoid tissue which is normally present in the upper part of the pharynx. They give rise to obstructed breathing, and the open mouth, which latter gives a stupid expression. There is a tendency to catch cold, and to have catarrh.

Rhinitis is inflammation of the lining of the nose, and is often accompanied by a watery or purulent discharge from the nose.

Tonsilitis is inflammation of the tonsils, due to exposure to damp and cold.

Laryngitis is inflammation of the voice-box, due to cold, over-use of the voice, or local irritation.

Tubercular laryngitis usually occurs as a complication of tuberculosis of the lung.

Acute bronchitis is an acute catarrhal affection of the windpipe and air-tubes leading to the lung. The causes are inhalation of irritating gases, exposure to cold and wet. It may become chronic after repeated attacks. It is a frequent complaint of the aged. In the nursing of this condition, consider the surroundings and diet. The patient must be kept in bed, and the temperature of the room regulated. The temperature should not be allowed to fall below 65° F., and may sometimes require to be higher. A moist atmosphere is generally most grateful to the patient, procured by the steam-tent, and steam inhalations, or a bronchitis-kettle kept going near the patient. There may be added to the kettle a little friar's balsam—1 teaspoonful to a pint of water.

Avoid draughts and dust. The diet must be nourishing—beef-tea, milk, eggs, and various broths—they should be given warm. Guard against bed-sores.

Pneumonia is an infectious disease caused by a germ which produces inflammation of the lung tissue. In broncho-pneumonia the diseased areas are scattered. In pneumonia a whole, or all lobes may be involved.

Nursing.—It must run its course. Careful nursing is required. The room should be well ventilated. Temperature 63° F., or it may require to be raised. Local applications—heat or cold—would be ordered by the doctor. The patient should wear a flannel gown. Replace the top sheet by the blanket, and make the upper bedclothes as light as possible. Absolute rest should be maintained. Limit the patient's movements in order to conserve his strength and to give his heart as little work as possible. Do not allow him to assist when he is moved or turned in bed. Learn to anticipate his wants, as, for instance, he must not be allowed to reach for a cup of water, nor to hold it when drinking, nor, after coughing, to wipe his lips, or allowed to talk much. Visitors should not be allowed without the doctor's permission. Watch for symptoms of delirium; the sputum, whether scanty or liquid, blood-stained or grey. Apply no restraint in movements in delirium; follow them and guide him in them, rather than restrain, as it may cause restriction in the movements of the chest.

For chart of temperature, see Chapter III.

The diet should always be such as is easy of digestion. Milk ought preferably to be boiled, and it is as well to dilute it with barley-water. Light broths, beef-tea and jellies may also be given. Guard against chills and bed-sores.

Pleurisy.—Inflammation of the lining which covers and protects the lungs.

Sputum.—Matter that is expectorated, or coughed up. In all diseases of the respiratory system, there is either mucus or pus, or both. In bronchitis it is frothy; in pneumonia it may be blood-stained, prune juice colour or liquid—the latter shows a serious form of pneumonia, whilst cessation of sputum on the fifth or sixth day often proves fatal. Currant jelly-like sputum denotes lung cancer.

Sputum-cup.—The sputum is best received in a special cup that can be burnt. When this kind cannot be obtained, porcelain cups with a movable funnel-shaped cover, and an aperture at the bottom of the funnel can be used. In the cup should be a disinfectant fluid—about one tablespoonful—such as carbolic lotion, 1 in 60. A piece of lint or linen soaked in the solution should be laid at the bottom of the funnel. The cups should be emptied frequently and boiled daily. An ordinary cup, jar, or jug may be used, and a piece of rag dipped in the lotion laid across the top.

Re handkerchiefs.—Pieces of gauze or linen that can be burned after use are preferable to ordinary handkerchiefs. Always save a specimen of sputum, if any, from a new patient for the doctor's inspection.

Baths.—The temperatures of various baths are :—

Hot	100° F. to 112° F.
Warm	90° ,, ,, 100° ,,
Tepid	80° ,, ,, 90° ,,
Cool	60° ,, ,, 80° ,,
Cold	under 60° ,,
Iced	,, ,, ,,

reduced by adding ice to the bath. The temperature of the bath should be taken before the patient is put in the bath, by the use of a bath thermometer enclosed in a wooden case, and this should be kept in the bath-room or in a handy place near where the patient is being bathed. When preparing the bath, always run the cold water in first, then add the hot water till the required temperature is reached. The principal uses of baths are: Cleansing, general stimulation, to induce perspiration, reduction of temperature and inflammation, as nerve sedatives, as counter-irritant.

Treatment of the febrile state.—Baths for hyperpyrexia are sometimes given four-hourly while the temperature is high. The temperature of the bath should be much the same as that of the body to avoid risks of shock, and then cooled down to the temperature ordered by the doctor, which may be from 95° F. to 65° F. Their duration also varies, from ten to twenty minutes being the average. *Cold baths* are given in the presence of a doctor. The patient is lowered into the bath on a drawsheet, covered by a blanket, the latter resting on the top of the bath when the patient is in the water. See that you have stimulants handy in case of collapse. Take temperature, pulse and respiration before, and an hour after the bath. The clinical thermometer can be placed in the mouth to watch the temperature during the bath. Chart the after-bath temperature in red ink.

Wet pack.—Anterior surface of the body. Protect the bed as for blanket-bath. See that the room is warm. Have several towels—number depending on their size—in a large bowl or tub of water. The doctor specifies the temperature of the water. Have also a bath thermometer, a basin of ice to keep the water of the bath at the required temperature, or have an assistant to frequently change the bowls of water; put a binder round the loins, an ice cap or cold compresses on the head, a hot-water bottle at the feet. Wring the towels—not too dry or wet, put them around the arms and legs, and over the chest and abdomen. Have an extra towel with which to start changing those on the body. Change them in turn, one every minute. As in the case of a cold bath, watch the temperature, pulse and respiration. When the required lowered temperature is reached, dry the body lightly and put on a warm, dry bedgown, and make up the bed, blanket next to the patient.

Cold pack—general.—Protect the bed as for a blanket-bath. The mackintosh should extend from the head to the feet. Remove the gown, pass a wet towel or folded sheet under his back and proceed as for anterior pack, wrapping it round the arms and legs, so that no two skin surfaces will come into contact. Keep the sheet constantly wet by squeezing water from a sponge.

Cold packs for chest.—These are sometimes used in pneumonia. Make a chest-binder as for jacket-poultice. Slip it under the patient. A compress consisting of three or four thicknesses of muslin is wrung out in water about 80° F.—the doctor states the temperature he requires—and placed on the chest. If the back is to be covered, a similar compress is slipped under the shoulders. The binder is fastened as in case of poultice-jacket.

The compresses are changed according to doctor's orders; in some instances the treatment is continuous and the compresses are changed every half-hour; in others they are changed every fifteen minutes for a given number of times, and the treatment then continued at definite times for three or four hours. After the treatment, carefully dry, put on a warm flannel gown and make up the bed. Keep a hot-water bottle at the feet.

Cold sponging.—Exclude draughts. Prepare the bed as for changing a drawsheet. Place a hot-water bottle at the feet on top of the blanket. Have two bowls of water—temperature as ordered by the doctor, which may be tepid, cold, or cold with ice in it. Have two large, smooth sponges, one in each bowl. Do not protect the bed with blanket and mackintosh, use small crib blankets, or small towels, as it is easy to get these under the different portions of the body as you sponge, and there is no risk of tiring the patient.

Prepare beforehand two additional bowls of water, because of the temperature of the water becoming warmed by the heat of the patient's body by dipping of the sponges. After removing the gown—which preferably should open all down the front, or back, so as to lessen exertion—turn him on his side, face towards you, and place one crib blanket well under him along the length of the back. Keep him well covered by his top blanket, and proceed to sponge his back.

Do the sponging with long, slow, steady strokes without any friction, allowing a little moisture to flow on the skin. Then lightly dry the skin. Remove the crib blanket. Next turn the patient on his back, and sponge the chest and abdomen in the same way. Keep his blanket well up to his neck and do the arms, taking out one at a time, placing a crib blanket under whilst sponging. Do the lower limbs by drawing the upper blanket aside, exposing a limb at a time. Place a crib blanket under the limb and sponge in the same way as the rest of the patient. The back of the legs may be sponged at the same time as the back to avoid raising them. Next the face and neck are done with cool fresh water. Put on the gown and make up the bed, enclosing a hot-water bottle near his feet. Twenty minutes is the usual time for sponging. But if the patient begins to shiver, or show any blueness of extremities, it is wise to stop. The temperature should be taken before and fifteen minutes after sponging. Sometimes a little vinegar is added to a tepid-sponge treatment.

Ice caps.—These are sometimes ordered. They are of india-rubber. A sponge bag, brown-paper bag, or a bladder from a butcher's shop may be substituted for the india-rubber cap, if made with a tight-fitting neck.

To fill an ice cap.—Break the ice into pieces about the size of a walnut. Expel the air from the cap by rolling up its ends, and only quarter fill it with ice. Put a piece of absorbent lint inside it, and sprinkle the ice with a little salt to intensify the cold. Fix on the cork.

The weight of the cap often irritates the patient. In such a case improvise some way of suspending it above the required spot, so that it will just rest lightly on the part. Always put an intervening piece of lint or linen between the ice cap and the body. Watch the melting of the ice, which empty and renew, or the fluid if left there is more likely to act as a poultice than the real treatment required.

Ice caps are often ordered for different parts of the body and must be made the required shape.

When ordered to give a patient *ice by mouth*, break the ice into pieces about the size of a pea. Place a piece of lint over a basin, stretch it tightly over the top, secure with tape on the outside. Put the ice on the lint. The moisture will pass through the cover into the basin and so prevent melting the ice. Feed the patient with a spoon.

Ice compresses.—The ice used for these may be economized by putting the ice—a large piece, size of compress—over a bowl, as above. Use two compresses, placing them alternately on the affected part and the ice.

Hot baths.—These are sometimes given to induce perspiration so as to lower the temperature. They are given at a temperature ordered by the doctor, usually from 105° F. to 110° F.

Hot packs.—These are often used in preference to hot baths.

To give a hot pack.—Prepare the bed as for general cold pack. Put an ice cap or cold compress on the head; changing the latter every two minutes.

Line a foot-tub with a large mackintosh; cover it with a drawsheet. Place two hot-water bottles on top. Now, soak two small blankets—one of which is kept doubled—in water 150° F., leaving out the two ends to hold while twisting.

Wring the blankets quite dry. Put them in the tub with the hot-water bottles, and cover with the ends of the mackintosh and drawsheet in order that they may be kept hot while being taken to the bedside in the tub.

Remove the gown. Slip the doubled blanket under the patient. Stretch the other blanket over his chest and around his arms and legs without exposing him. Tuck it snugly round him, especially at the neck. Place his top blanket loosely over him. Then put hot-water bottles—4 in. away from the edges of the wet blankets—on top of his top blanket; one by his knees, on both sides; one at his feet, and, if considered necessary, on either side level with the axilla.

Cover all with the rubber which lined the tub. Take the pulse frequently at the temporal artery. Encourage the patient to drink copiously of hot or Vichy drinks.

After twenty to thirty minutes, remove wet blankets and mackintoshes. Roll dry blankets tightly around the patient. Let him remain thus for an hour, keeping the cold application on the head and the heat at the feet.

At the end of an hour lightly rub the body with spirit lotion to energize the nerve-centres.

N.B.—Stone ginger-beer bottles make excellent substitutes for hot-water bottles. Stockings make good bottle-covers.

Exposure is avoided by working under the blanket which covers the patient.

Never put hot-water bottles next to the wet blankets. Hot packs are also frequently ordered when the kidneys are not working properly.

Modified hot packs.—These are sometimes given in connexion with drugs to induce the skin to act.

To apply such a pack.—Remove the gown, roll the patient in a hot, dry blanket. Place hot-water bottles at his feet and along his sides, and cover him with a mackintosh, tucking it firmly under the mattress. Leave him thus for half an hour, or longer if necessary.

Local hot pack.—An arm or leg is sometimes put in a hot pack as a treatment for rheumatism. Pass a mackintosh, covered by a double piece of old flannel or blanket, under the limb, which then envelop in flannel or blanket which has been wrung out of water, temperature 150° F. Roll the dry blanket around this. Place a hot-water bottle at the side. Cover with the mackintosh. After removing the pack, rub the limb gently with spirit lotion and wrap it in cotton-wool and loosely bandage it.

Hot-air and vapour baths.—In giving these baths the detail of procedure varies a little, but the main points are the same. These are :—

To bear in mind the danger of burning the patient, also the fact that he is likely to become prostrated by the heat. To take the pulse at the temporal artery every few minutes ; keep an ice cap or other cold application on the head, not only during the bath, but for some time after it. Arrange the bath so that there will be no escape of heat, also, if for any reason, it is impossible to obtain a sufficiently high temperature, to raise it by the use of hot-water bottles. Unless liquids are to be restricted, give as much hot drinks as the patient can take, such as lemonade, beef-tea. Keep the patient rolled in a blanket—warm, dry one—for about an hour after the bath. Dry and rub vigorously before removing the blanket. Avoid exposure either while taking out of the bath or the dry blanket. The requirements are: Ice cap or compresses; hot-water bottles; three or four *old* blankets; two large mackintoshes to fit from head to foot of the bed; *wooden* bed-cradles; bath thermometer; hot drinks; asbestos or wet flannel to protect the hot-air pipe.

The apparatus is one which will convey either hot air or vapour through the pipe into the bed. It is in the form of a steam kettle. At the side opposite the pipe is an opening, at the lower end, where the spirit lamp is placed. And above it, in the dome top is the place where the boiler is fixed, and the opening to it is on the top of the dome, through which the water is poured. The boiler can be removed for the hot-*air* bath, making a through opening for the air to the pipe.

For a vapour bath, an ordinary bronchitis kettle filled with boiling water may be used. If its spout is not sufficiently long to go inside the cradle, attach to it a piece of tin tubing.

Method of giving the bath.—Remove the upper bedclothes, except the lower blanket. Take one old blanket, which must be warmed, and replace it for the lower blanket in the same way as when replacing top sheet and blanket.

Pass a mackintosh between two blankets under him. Put a sufficient number of bed-cradles over him to extend from his neck to his feet. Cover these with a mackintosh.

Draw out the blanket covering him and pass it up over the cradles *under* the mackintosh.

Take off his gown. Put the cold application on his head; hot-water bottle, covered, at his feet, and cover the latter with the blanket on which he is lying, because the hot air or vapour comes in almost directly over the feet.

Hang the thermometer on the cradle at the top. Draw the ends of the mackintosh and blanket, which are under the patient, up over the cradle, under the mackintosh and blanket covering it. Tuck in the latter under the patient on both sides and around the shoulders and neck.

Now fix the apparatus in position; putting the top end of the pipe in, under the cradle 3 or 4 in., and cover this part of the pipe with asbestos or wet flannels. Tie the pipe to the cradle at least 4 in. above the feet.

See that the feet and lower part of the legs are securely covered, and apart. At the bottom tuck the blanket, etc., under the mattress, folding them round the pipe.

Put two extra blankets over the cradle and then the spread or a top sheet. Tuck them in only at the foot, and treat them there in the same manner as the blanket, taking care that the asbestos protects all from the pipe.

N.B.—In the case of a vapour bath, reverse the positions of the mackintosh and one blanket, *over* the cradle.

Put the lamp or burner in and light it; so regulating it that the temperature inside the cradle is as ordered by the doctor; usually in hot-*air* baths from over 100° F. to 150° F. In *vapour* baths it is seldom higher than 110° F.

Give hot drinks while he is in the bath.

The bath is generally continued twenty minutes after the stated temperature is reached, then extinguish the light; remove the apparatus before disarranging the bed.

Aperients, such as Epsom salts and castor oil, are also given to help to increase the amount of warm excretions in fluid form.

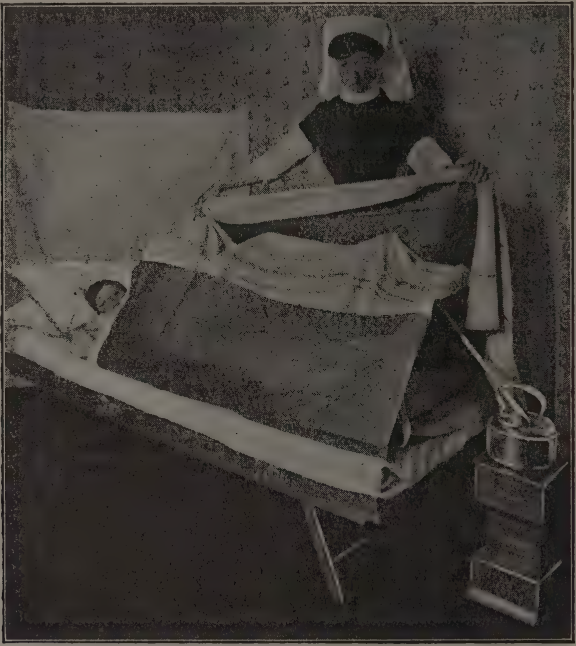

FIG. 10.—Hot-air or vapour bath. Under blanket and mackintosh brought up; upper blanket and mackintosh being placed over them; bronchitis kettle in use, showing its position *after* blankets are fixed.

Sulphur bath.—This must never be given in metal-lined baths, as sulphur discolours metal. Mix about 6 oz. of powdered sulphur in boiling water and pour the mixture into a full-sized bath. Give at the ordinary temperature, 99° F.

Soda bath.—Dissolve a quarter to half-pound of soda in a full-sized bath. More soda may be added if the bath is given for Rheumatism. Temperature 99° F.

Bicarbonate of soda bath.—Used to allay itching of the skin. Dissolve bicarbonate of soda in the bath water, allowing 8 oz. of soda for every gallon of water. Temperature 99° F.

Boracic bath.—For leg and arm baths to cleanse a wound, also given in skin ailments. Dissolve six tablespoonfuls of boracic acid crystals into an ordinary-sized bath. Keep the patient in for half an hour. Temperature 99° F.

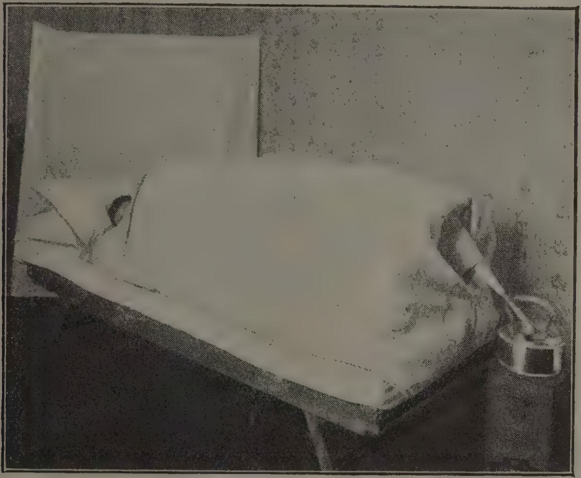

FIG. 11.—Hot-air or vapour bath. Showing upper blanket and mackintosh tucked in *under* the cradle, under blanket and mackintosh. Extra blankets may be placed over the whole, as explained.

Salt bath.—This is given for its tonic effects. Dissolve 10 to 15 lb. of sea salt in a bath half-full of hot water. Allow to cool to the required temperature. In giving this bath, rub the patient well while he is in the bath, and rub him again briskly with hot towels after he leaves the bath.

Bran bath.—Boil a pound of bran in a bag for twenty minutes. Drain off the fluid and add it to the bath water. The bath should be half-full of water. Temperature 99° F.

Starch baths.—Dissolve half a pound of starch in cold water. Mix this with two quarts of hot water and add it to the bath water. The quantity and temperature of the water are the same as the bran bath.

Sulphur, starch, bran and bicarbonate of soda baths are given in certain skin diseases.

The patient lies quietly in the bath for from five to twenty minutes, at the end of which he is enveloped in a hot sheet and dried gently by patting—never by rubbing—with hot towels.

General continuous baths.—Suspend the patient in a hammock which can be made of a draw-sheet held on each side. Put a rubber air pillow or ring under his head. Have the water come up to his neck and keep it at a uniform temperature. To keep the covering of the patient—viz., the blanket and sheet—place some slats of wood across the top of the bath. When it becomes necessary for the patient to use the bed-pan, raise the hammock so that the body will be out of the water. Lift the patient out of the bath twice during the twenty-four hours and change the water. Scrub and disinfect the bath before refilling it.

CHAPTER V.

INFLAMMATION: ITS CAUSES, SIGNS, AND TREATMENT.

INFLAMMATION may be defined as a "succession of changes" which occurs in living tissue as a result of irritation from any cause, provided that such irritation does not at once cause death of the tissue.

This defines all degrees of intensity, from the slightest changes to ultimate death of a part, which latter is called gangrene.

The causes are: "Exciting"—such as germs, heat, cold, pressure, violence, friction, and these causes are often accompanied by:—

"Predisposing" causes which are: old age, heredity, various diseases, and any interference with blood supply in the part affected. A blow would set up inflammation, or even mortification in an old man, whereas in a youth it would cause little or no ill effect.

Signs of inflammation.—There are four cardinal signs, viz.: heat, pain, redness, swelling.

In addition there may be various general symptoms: fever, shown by rise of temperature; headache; constipation; digestive derangements; increased pulse rate; and where there is formation of pus—rigors.

Process of inflammation.—The blood-vessels dilate and the stream within them is quickened, so that more blood is brought to the part. Then the current begins to slacken, and the small blood-vessels get more and more full of the cells of the blood. The white cells, which are the more adhesive, keep close to the walls of the vessels, while the red cells remain in the middle of the stream. This stage is called "congestion".

This crowding together of blood-cells goes on, until finally the vessels in the inflamed area become quite choked with red and white cells, so that the blood stream in that part is, for the present, completely at a standstill.

This is now a condition called "stasis".

The next stage is the occurrence of some of the white cells gradually working their way through the wall of the vessel, until they appear in the tissue outside the vessel. With them escapes a certain quantity of the fluid portion of the blood and lymph.

This is called the stage of "exudation". And a good example of it is seen in the production of a blister. Next, if the inflammation is sufficiently intense, the red cells follow the white ones, being forced outside by the excessive pressure within.

Terminations of inflammations:—

1. If slight, the vessels gradually recover; cells and fluid disperse; and the circulation is re-established.

2. By partial removal of fluid, resulting in a fibrous healing of the part.

3. The process may increase in severity, resulting in formation of pus.

4. Finally the part affected may die from a cessation of blood to the part, owing to the intensity of inflammation—gangrene.

Process of union of bone and skin:—

Bone.—The two ends of a broken bone are set by the surgeon in such a manner as to ensure accurate apposition of the fragments and so favour a natural union of bone. A material called "callus," which may be likened to a cement, is thrown out between and around the fragments, which, together with blood and nerve supply, become welded together.

Great care must be exercised during nursing after the surgeon's duties to avoid displacing the bones. Guard against bed-sores by all preventative means, also splint-sores. Note any rise of temperature, increased pain, swelling, or numbness below the seat of fracture.

Union of skin.—The surfaces of the wound must be in contact, and all sources of irritation and suppuration are to be prevented to ensure the best healing, which is called "first intention". In this process of healing a sticky fluid, called lymph, is poured out from the surfaces in apposition, which binds them together.

Then new blood-vessels are formed and also numerous small cells which eventually change into fibres forming a fibrous tissue. The healing is generally complete in from ten to fourteen days, but it may be prevented by—(1) want of antisepsis, (2) incomplete rest, (3) foreign bodies, such as bloodclot, (4) lowered vitality resulting from ill-health, alcoholism, etc.

The next healing—second intention—is a condition where the surfaces do not come into apposition, resulting in a glazed appearance, due to serum of the blood poured on the surfaces, and growth of red spots or granulations resulting in a protracted healing and a scar.

TREATMENT OF INFLAMMATION.

Applications of cold or heat are beneficial when, in addition, there is rest and elevation of the part affected.

Cold acts best when applied continuously, either as evaporating lotion, or ice in bags. And during its application the patient should be carefully watched to prevent undue depression taking place.

Cold acts in the early stages by contracting the blood-vessels, so lessening the blood supply to the inflamed area. It also tends to check the emigration of the white cells from the blood-vessels into the tissues, thus helping to keep down the swelling.

This explains the usefulness of cold applications in the early stages of a sprain.

Heat applications, on the other hand, increase the dilatation of the blood-vessels, thus bringing more blood to the part, and so, by increasing the force of the current, helps to wash on some of the cells that are blocking the way.

Though acting differently from cold, hot applications can, therefore, also do good at the commencement of inflammation.

Heat is applied either dry or moist, which latter is more penetrating, in the form of hot flannels, bags, bottles, etc., and fomentations, poultices, counter-irritants, etc.

Fomentations—for wounds.—Get ready on a tray beforehand a double piece of lint for the foment the size of the wound, cut square with corners rounded, a strong towel or wringer, bowl, boiling water, jaconette or substitute—such as brown paper, cut half-inch bigger than the lint; a good absorbent wool covering, 1 in. bigger than the jaconette, and a bandage. Put the wringer over the bowl, the lint inside the wringer.

Place a screen round the bed. Have bowls containing lotion, such as carbolic, 1 in 20 strength; swabs of wool in lotion; forceps and scissors in lotion; receiver for soiled dressing and swabs; clean mackintosh for the bed.

Remove the bandage; scrub hands and arms and make them aseptic; remove the soiled dressing with forceps; swab the wound, then cover with a wet swab from the lotion.

Prepare the fomentation by pouring boiling water over it, cover, and dip the wringer well into the bowl so that the foment may get well soaked with the water. Cover the bowl with a towel and carry it and other materials, on the tray, to the bed-side.

Take the wringer and wring it out well by twisting the two dry ends of the wringer in opposite directions. Wring very dry so as to avoid scalding the patient by water left in the foment.

Open the wringer, take out and shake the foment-lint *quickly*—to let out the steam—and apply to the wound after removing the swab with forceps; cover with the jaconette and wool. Then secure with a bandage.

It is well to cut a quantity of foments ready of the required size; the bits from the corners utilized by placing them inside films of gauze for swabs.

Boracic fomentations are made by pouring boiling boracic lotion over the foment-lint as above, or using boracic lint and pouring boiling water over it as described.

For pain—inflammation and soothing effects. Flannel may be used for such fomentations, adding boiling water. Turpentine or sedatives may also be added to the water.

To make the foment.—Get ready beforehand a double piece of thick soft flannel for the foment, half-size bigger than the area of application, a strong towel or wringer, bowl, boiling water, a protector—jaconette or substitute, such as two folds of strong brown paper, 1 in. bigger than the foment; a good woollen or flannel covering, 2 in. bigger than the protector, to keep in the heat.

If for the abdomen, the covering should be large enough to cover the lower part of the trunk of the body.

Prepare the part affected by removal of bandage, if any, and leave the body linen arranged so as to more readily expose the area when the foment is ready.

Prepare the fomentation.—Double the flannel and place it in the wringer. Place the wringer over the top of the bowl. Pour boiling water—from the kettle—over and through the foment-flannel. Close up the wringer; dip the wringer well into the water, then, when well penetrated, cover the bowl and carry it, with other requirements, to the bed-side. It must be well covered by a thick towel to keep in the heat.

To apply.—Uncover the wringer, expose the area of application, then remove the wringer and twist the two dry ends of it in opposite directions. Wring very dry or the patient will surely be blistered, and the bed made damp.

Open the wringer. Take out and shake the foment to let out the steam, and apply to the part. Cover with the protector and wool. Secure with bandage.

The bed, etc., should be covered with a mackintosh as in the case of other fomentations.

Turpentine fomentation.—Prepare as described for fomentation for pain, etc., and after pouring the boiling water over the flannel, and before wringing it, put the quantity of turpentine into the water, and when well mixed together dip in the wringer and well penetrate it, and proceed as above.

The quantity of turpentine for an adult is from one to two tablespoonfuls—children only one-third quantity.

For first foment, only put half a tablespoonful of the turpentine in the water—to test the skin.

It is a dangerous method to pour the turpentine *on* the flannel in the wringer, because it is apt to cause blistering of the skin under the parts where the turpentine has mostly penetrated the flannel.

Sometimes it is ordered to be applied as follows:—

For adults,	mix one part turpentine and four parts olive oil.
For a young person,	mix one part turpentine and eight parts olive oil.

Paint the mixture over the area, using a small brush. Then apply a flannel fomentation.

Poppy-head fomentation.—Poppy-heads contain opium, therefore give soothing effect in addition to the moisture and heat from the fomentation.

In the proportion of six poppy-heads to one and a half pints of water, boil for twenty minutes. Then pour the strained liquor on the flannel in the wringer, and apply as above.

Laudanum—tincture of opium—in the proportion of two teaspoonfuls for an adult, abdominal area, may be sprinkled over the surface which is to go next to the skin, *after* removal of the foment-flannel from the wringer.

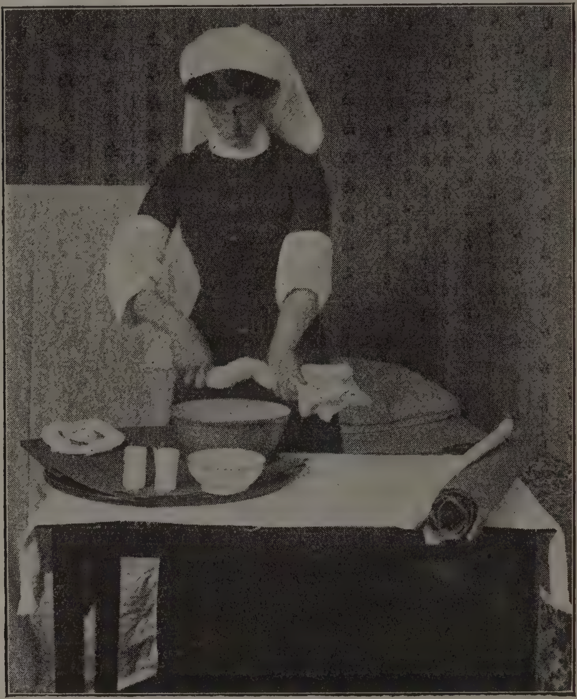

FIG. 12.—Fomentation wringing. Showing mackintosh (brown paper), small towel, swabs, wool covering and jaconette, bandages, ready on a tray.

Hot lead and opium lotion is used instead of laudanum.

Vinegar fomentation.—This is used over the front of the neck in cases of croup. Use hot vinegar—not boiling. Apply as for plain foment for pain, using flannel. Great care should be exercised to avoid risks of burning the skin, by placing a thin layer of muslin between the skin and the fomentation. In a case of emergency the handkerchief may be used in the event of no muslin at hand.

Hot-water bags should be very light and very hot, hence they should have very little water and no air in them, and should be changed frequently. Their effect upon the skin should be carefully watched, as also in the case of all fomentations, because, although required as hot as possible, we must not run risks of burning or scalding the skin by inefficient wringing.

Foments for the eye.—Lint or clean linen should be used. Flannel is too heavy. The same lint should not be used twice, neither must both eyes be covered by the same fomentation. The pieces of lint must be of two thicknesses, and 2 in. square with the corners rounded.

Foments for the breast.—When applying to the breasts, cut a hole in the centre of the flannel or lint for the nipple, as it must not be covered.

Poultices.—Poultices are best spread on material that will retain the heat—old flannel, lint, strong linen, brown paper, or teased tow placed in successive layers forming a good thickness. Small poultices may be spread on thinner material such as muslin.

A poultice should always be covered with a protector—oiled silk, jaconette, or strong brown paper, cut half an inch larger than the poultice; also a woollen covering, such as absorbent wool or flannel, to retain the heat.

A poultice for the chest should always be shaped to fit well around the neck and armpits.

Secure with bandage, or, in case of the chest, abdomen or lumbar region, a binder, which should be fixed in readiness, and which is best made of flannel with two narrow straps fixed on the upper margin in the middle, which middle fits at the back; the straps cross at the back and pass over the shoulders, fastening in front.

A poultice jacket—to hold the poultice in position—for the chest can be made of flannel.

To make one.—Take a yard, more or less, according to the size of the patient, fold in half, and cut a hole in the centre of the fold large enough for the patient's neck. Cut along one shoulder. Then bind all raw edges, except on the side of the closed shoulder, which should be stitched up, leaving a space near the fold for the armhole. Stitch tying-tapes on the open shoulder, also the open sides, from armpit to lowest edge.

The jacket should be warmed before applying to the body; a protector should intervene between it and the poultice.

When poultices are discontinued, put on a gamgee jacket made in the same way as above. To make the gamgee tissue: put a thick layer of wool between two layers of gauze, and cut out as described. See Illustration, Chapter IX.

Always make two jackets, either flannel or gamgee, so that the patient may have a freshly aired one night and morning.

To apply the jacket for poulticing.—Fix the closed shoulder on by placing the arm through the armhole. Gently turn the patient over on the opposite side; place the *back* portion smoothly over his back; put him lying on his back again. Place the front portion over his chest. Leave untied in readiness to apply the poultice.

The jacket is useful when a poultice is ordered to encircle the chest, back and front.

To be efficacious, make the two poultices, one each, back and front. Carry to the bedside with materials required. And, the patient prepared and wearing the jacket, turn him on his side with the open side of the jacket uppermost. Apply the *back* poultice and jaconette. Then put him lying on his back again and apply the *front* poultice and jaconette, and tie the tapes.

Usually a poultice is changed every two or three hours, and the fresh poultice should be ready before the old one is removed.

After removing the old poultice dry the surface of the skin, applying a little oil to allay irritation.

The area poulticed should be quickly and carefully washed once in every twenty-four hours.

Poultices should be made expeditiously in order to supply the aim of a poultice—moisture and heat. So, to add to its success, everything required should be in readiness before starting to make the poultice.

The materials required for poultice-making are:—

Crushed linseed which is better than linseed meal, it containing more oil, which is a necessity; a spatula, broad-bladed knife or wooded spoon; mixing-bowl; quart jug to hold the spatula in hot water; kettle of boiling water; a foundation of two or three layers of old blanket, which will not conduct the heat from under the poultice during spreading—brown paper or newspaper will answer the purpose; two plates warming in the oven; one large towel to cover the plates when carrying the poultice to the bedside; lint, linen, cotton, muslin, or brown paper on which to spread the poultice. At the bedside have bandages and safety-pins. If a binder, have same fixed on the patient, as described.

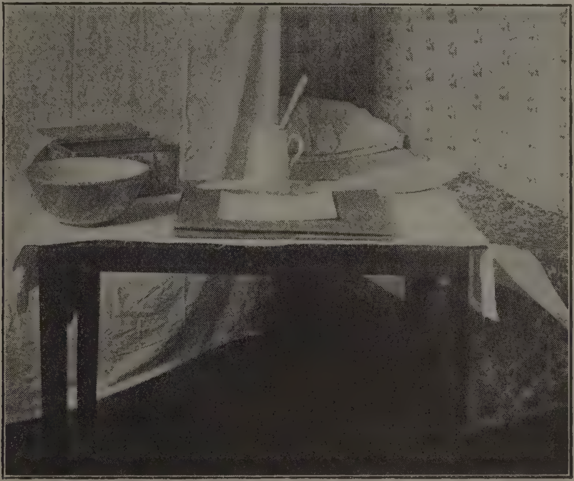

FIG. 13.—Showing materials ready tor poultice-making. The plates should be put in the oven whilst mixing and spreading the poultice.

Be sure that everything is in readiness. Close doors and windows before mixing the poultice.

Fix the foundation; place the mixing-bowl next to it on the left-hand side; next to this the linseed; the quart jug containing hot water and spatula behind the foundation; next to it, on the right-hand side, place the open towel; two plates in the hot oven. See that the water in the kettle is quite boiling. Rinse the mixing bowl with boiling water to warm it; empty it, and then put into it the amount of water required to make the poultice. This can only be learnt by experience. Next, gather the linseed up in the palm of the left hand, and put it into the water. Take the spatula in the right hand and stir up the water and linseed together very quickly—stirring properly, from the bottom—adding with the left hand whatever more linseed may be required. Do not *sprinkle* the linseed into the water. This wastes time and the heat of the water. Thrown into the water in handfuls, it does not get into knots and the poultice will be hotter when quickly made. Do not put too much linseed into the water, or you will not have sufficient moisture, and, being very dry, it is liable to break and so let out the heat. The mixture should come freely from the sides of the bowl when there is sufficient linseed in it. So, do not waste time testing whether the spatula will stand straight up in the mixture. If the poultice is made too moist, it will stick to the skin, and there is also a danger of scalding the patient. Turn the mixture out on to the flannel or linen and spread lightly with the spatula, dipped in the hot water to facilitate spreading *evenly*, making the poultice not more than three-quarters of an inch thick. If this thickness is found to be too heavy, especially for the front of the chest, spread it half an inch thick. The poultice must be of a certain thickness in order that it may more readily retain its heat. But if so thick as to be heavy it adds to difficulty in breathing. Now fold in the margins of the flannel or linen about an inch all round; roll the poultice; place the two hot plates on the open towel; put the poultice on one plate, and cover with the other plate and the towel, and carry to the bedside. It is not necessary to put a layer of gauze on the surface of the poultice.

If the poultice is quickly made by the above method, it can be applied at once without wasting time testing the heat of it on the face or back of the hand.

To apply a poultice.—Put it on slowly, for the patient will be able to stand it hotter if it is let down a small piece at a time, yet not so slowly as to allow the poultice to get cold.

Mustard poultice.—Use one part mustard and four parts crushed linseed. Mix the mustard to a paste with a little cold water in a cup or tiny bowl. Then make a linseed poultice, as described and stir in the mustard, previously prepared, just before spreading the poultice, which must be spread nearly half an inch thick on flannel or linen. Cover the surface with gauze or butter-muslin, and apply as a linseed poultice.

The above is the quantity of mustard generally used, but after the poultice has been in position two or three minutes, raise a corner of it to see whether the skin is reddening for a blister or not. It is intended to "redden"—not to "blister".

For a young person, use one-third the above quantity of mustard.

Charcoal poultice.—Mix one part charcoal in five parts crushed linseed. Then make as a linseed poultice. Spread on old linen; cover with very thin gauze and apply to the part, putting a thick layer of cotton-wool over it. Secure with bandage.

Bread poultice.—Put stale bread into a saucepan containing boiling water. Boil for five minutes. Strain off the water, and spread it on stout linen. Cover as a linseed poultice.

Starch poultice.—For certain skin diseases. Use white starch or starch powder. Add to it boracic powder in the proportion of one teaspoonful to every four tablespoonfuls of starch. The quantity of starch prepared will depend upon the size of poultice required. Mix the boracic powder and starch—powdered—well together in a bowl. Add sufficient—not too much—cold water to mix it. Mix it with a wooden spoon to a thick smooth cream. Do not allow any dry starch to remain on the sides of the bowl. Hold a kettle, containing plenty of boiling water, in your left hand. With a wooden spoon in your right hand, keep on stirring the starch from the bottom of the bowl, while you add the boiling water as quickly as possible from the kettle. When you see the starch change colour *slightly*, put down the kettle, but continue to stir the starch vigorously for some time. Empty the starch into an iron saucepan and boil it for two minutes. Then, when the mixture has cooled a little, spread it evenly—half-inch thick—on a piece of stout linen. Turn over the edges as in the case of a linseed poultice. Apply at the temperature of 99° F., which is a little above blood-heat.

Starch poultices are usually applied four-hourly; the old one to be soaked well in an antiseptic lotion before removal.

Mustard leaf.—To prepare a mustard-leaf, dip it in tepid water and fold it in gauze or butter-muslin in such a way that there will be one thickness over its mustard surface and three or four on the back. Carry it to the patient inside a towel. Apply the side which has only one thickness of gauze to the skin, and lay the towel over it.

Mustard plaster.—Mix one part mustard with three to six parts flour, crushing all lumps with the fingers. Add sufficient cold water to make the mixture thin enough to be spread on gauze or muslin. After spreading, envelop the plaster in gauze and apply in the same manner as the mustard leaf.

Mustard leaves and plasters should remain on until the skin is reddened—generally fifteen to twenty minutes. When the patient's skin is tender, it is advisable to add olive oil as it will lessen the tendency to blister without detracting from its strength.

After removing the leaf, plaster, or the poultice wash the skin, apply a little oil, and cover with a pad of wool. Secure with bandage or strapping.

Mustard baths and foot-baths.—Use in the proportion of two tablespoonfuls of mustard—preferably hydropathic, black mustard—to a gallon of water.

For a foot-bath mix the mustard to a paste with *cold* water —hot water kills the active principle of mustard—gradually increase the temperature of the mixture by adding warmer, then hotter, water until the required quantity of water is reached, also the temperature of such a height that it is as hot as the patient can bear it. Keep the patient wrapped in a hot blanket, his feet in the water—water well up above the calves of the legs—for twenty minutes, keeping the water at the same temperature by adding boiling water—pouring it down the sides of the bath. The patient should go to bed immediately, wrapped in the hot blanket, also extra ones ; a hot-water bottle to the feet.

Tincture of iodine is frequently employed as a counter-irritant.

If the doctor does not apply the iodine, he defines the area of application.

To apply—prepare a tray with iodine in a small vessel, such as a medicine measure ; a camel's-hair brush ; and a small vessel containing a little olive oil. Wash the area with hot water and soap to remove dirt and natural oil from the skin, also to bring the circulation of blood to the part. Make a ring of olive oil with the brush around the area of application, to prevent the running of the iodine. Apply evenly one or two coatings, according to orders given and the amount of irritation required, allowing the liquid to dry between applications. If the irritation proves too severe, wash the surface with oil or ammonia. Never put the brush into the iodine bottle. Cover with a layer of wool and secure it with a bandage.

In the application of embrocation, oils and ointments by inunction, the area of application should be washed, as above.

There are many other forms of counter-irritation.

A counter-irritant is an application made to the surface of the body to relieve a deep-seated inflammation.

It has been shown that when the vessels of the skin are dilated by the application of an irritant, those of the subjacent organs are often contracted, thereby relieving any congestion and pain.

Counter-irritation may be made either directly or indirectly over the seat of inflammation, or at a distant part of the body. Thus a hot foot-bath is given for the relief of pain in the head or abdomen, for colds in the head, and for sore throats.

Counter-irritation may also be made at a spot known to be connected intimately with the diseased area by nerve-fibres. Thus, in diseases of the eye the blister is sometimes applied at the back of the ear.

The mustard applications, as described, viz., poultice, leaf, pastes and foot-baths, are employed as counter-irritants, also hot-water bags and bottles, application of iodine, etc.

CHAPTER VI.

INFECTION.

Infection.—By infection is meant "an invasion of the body by a living germ".

The word "Specific" is used to various fevers because such conditions are caused by a special germ. There is a specific origin for each disease.

The Eruptive fevers are specific, and they breed true, i.e. a case of measles, for instance; the germ of measles cannot give rise to mumps or whooping-cough, but only to measles; and scarlet fever is caused by a particular poison which produces this disease only, and the same applies to others of the group.

The eruptive fevers are remarkable chiefly for occurring in epidemics, often at regularly recurring periods. The contagion being very commonly disseminated through the air, it is easy to understand how these diseases, once introduced into the community, spread with considerable rapidity.

An Epidemic signifies a widely prevalent and rapidly spreading outbreak of disease.

There are other diseases which at times are epidemic, but mostly "endemic"; that is to say, they are always present in certain localities, where conditions of excremental pollution of water, air, food or soil favour the passage of the specific cause from one person to another.

Cases which occur singly and independently of any discoverable infection are called "Sporadic". The constant occurrence of such cases may give rise to an epidemic at certain seasons when the conditions are favourable.

An epidemic assuming very extensive—geographical—proportions is termed a "Pandemic".

Fomites are substances capable of retaining infection, such as bedclothes, bedding, carpets, curtains, towels, letters, books, dirty hands and instruments, also foul water and air, contaminated foods, defective and badly disinfected drains.

Infectious diseases may be contracted from infected cushions and the materials covering the seat and floor of railway carriages, cabs, tramcars and omnibuses.

Cats have been shown in some cases to have spread diphtheria.

Many outbreaks of smallpox have been traced to tramps.

Persons apparently in good health may carry on their mucous membranes micro-organisms of disease, which, when communicated to other persons, may give rise to the corresponding disease. Such persons are called "Carriers". Vermin, as in typhus. Insects and flies are carriers of disease.

Disinfectants.—No agent can be regarded as a disinfectant unless it is capable of destroying germs. Agents which merely stop the growth and prevent decomposition are Antiseptics.

Agents which oxidize or absorb odorous products are Deodorants.

Disinfectants may be divided into two classes: (1) Physical Agents; (2) Chemical Agents.

Physical agents are light and heat.

There are four methods of disinfection by heat, viz.: (1) boiling; (2) use of live steam; (3) use of live steam under pressure; (4) by hot air or dry sterilization.

Boiling.—Metal articles with plain surfaces, such as scalpels and needles—require thirty seconds exposure to influence of boiling in a 1 per cent solution of soda. Where there are grooves and joints, or when the object is rubber, i.e. gloves, catheters, rectal tubes, tubing—three to five minutes are necessary. Absorbent articles—twenty to thirty minutes are required, according to thickness.

Water to be sufficiently sterile for surgical purposes should be boiled for twenty minutes.

Steam.—Articles sterilized by steam—not under pressure—are exposed to its influence on three successive days, from forty minutes to an hour each day. The maximum temperature which is 212° F., or 100° C., does not kill the spores of germs, hence the reason for the successive steamings. Between each steaming they are kept at 80° F., to develop and destroy the spores.

Steam under pressure.—By this method a much greater degree of heat is possible, so that one sterilization is sufficient. Steam under pressure is commonly used in the preparation of sterile dressings, sterile solutions, etc., and they are exposed to a 15 lb. pressure; temperature 250° F., for half an hour.

In sterilizing liquids in this way, it is best to wait until the apparatus has cooled before releasing pressure to prevent the bursting of the flasks by the boiling of the heated liquids.

Liquid disinfectants are:—

Corrosive sublimate—a preparation of mercury.—To be thoroughly disinfected, articles must be soaked in perchloride of mercury, 1 in 1000 for twenty minutes; in 1 in 5000 for at least an hour. It will discolour clothing, corrode metal, marble, porcelain and wood, so it must not be used for their disinfection. It is a valuable disinfectant for the hands, also for glass utensils; strength, 1 in 1000.

It has been shown that, as it hardens albuminous matter, it forms a coating over masses of excreta, making same impervious to the solution, thus lessening its action.

It is sometimes used for irrigation of wounds. Tablets of compressed perchloride of mercury may be procured—one tablet dissolved in one pint of boiling water makes a 1 in 1000 solution.

Carbolic.—A solution, 1 in 20, if in direct contact with sporeless organisms will kill them in a few minutes, but it will require several hours to destroy spores.

Carbolic will not discolour white materials, nor metals, and may be used for the disinfection of such articles.

It may be used to disinfect excreta. To be effectual for this latter purpose a 1 in 20 solution must be used and a quantity that will be double the amount of the excreta. Excreta must be exposed to its influence long enough to destroy spores.

Lysol is a coal-tar derivative. It is equal in strength to carbolic. It is used for disinfecting utensils, but is very expensive if used the required strength to be of value. For douching it is used 1 in 100.

Izal fluid—for general disinfection. It is miscible with urine and salt water. It possesses good germicidal power. For disinfection of clothes use at the strength of 1 in 200.

Cyllin—for general disinfection. For disinfection of clothes use at the strength of 1 in 200.

Chinosol, 1 in 1200 strength for washing hands before and after operations, will rank with perchloride of mercury of similar strength. It does not corrode instruments or injure the hands. A 15 grain tablet in half a pint of water makes a solution 1 in 1200 strength. It is a readily soluble crystalline yellow powder.

Sanitas-Okol.—Does not stain linen used in the strength of 1 in 20. It is an emulsified disinfectant of the coal-tar order.

Creolin.—It is used as a disinfectant, and deodorant for suppurating and offensive wounds, in solutions of from 2 to 5 per cent. When diluting creolin—according to directions—always pour the water into the vessel *before* adding the creolin. The water must never exceed 99° F., or the drug will be too thoroughly dissolved and its strength thus impaired. Creolin exposed in an open dish is a slight deodorant.

Gaseous disinfectants.—(1) Formic aldehyde vapour; (2) sulphurous acid gas; (3) chlorine gas.

Formic aldehyde is used for disinfecting surfaces of rooms, such as walls, etc.

Sulphur dioxide is especially efficacious for the destruction of vermin.

Fresh air and sunlight have the power of rendering the infection of diseases harmless.

Solid disinfectants are: Carbolic powders; slaked lime; and ordinary disinfectant soaps.

Antiseptics.—Boracic acid is used for bladder, eye and nasal irrigations, etc., and for mouth-washes; generally in 1 in 20 and 1 in 40 strength solutions. It should be sterilized.

Peroxide of hydrogen.—It is valuable for cleansing of infected wounds. The active effervescence which takes place as soon as it is poured into a wound carries off morbid and suppurating tissue. It is also used to control the oozing of blood from capillaries.

Salt solution.—This is very much used, on account of its stimulating effect on tissue, in cleansing of wounds, bladder irrigations, etc. When employed, it should be sterilized. It is called "normal salt solution," because it contains about the same amount of salt as the blood-serum. A 1 per cent solution is accurate.

Nowadays the preparation of normal saline is made easier, as salt is sold in the form of tablets containing the exact amount to be added to a definite quantity of distilled water.

To make one pint, add one teaspoonful of salt to a pint of boiling water. Filter it by placing a funnel, with a piece of absorbent lint in the bottom and lining it, in the neck of an empty flask or bottle. Pour the solution in, a small amount at a time, allowing it to filter slowly through. Six filterings are necessary. When the filtering is finished, make a large sterile non-absorbent cotton plug for the flask, and bandage it in place.

In an emergency, sterilize it by placing the flask in a kettle of water, and let it remain there half an hour after the solution has been brought to the boiling-point.

The flask must never touch the bottom of the kettle or it will break. This may be prevented by placing under it a pad made of a few thicknesses of old muslin or gauze.

When making other solutions.—To estimate the amount of drug to be used, reduce the amount of solution required to minims; multiply by the rate per cent, and point off two places.

Thus: it would take 768 grains of perchloride powder to make one quart of a 4 per cent solution.

Lotions are usually made up in dispensaries in institutions. In home nursing it is best to order from the chemist the quantity of lotion at the strength required.

Methylated spirit is very much used in surgery.

Spirit lotion is made by mixing 1 tablespoonful of spirit of wine; 2 teaspoonfuls of nitre; ½ pint of water.

"Bath and food" thermometers can be procured and used to test the heat of lotions.

Isolation and disinfection in a private house.—When possible two rooms and an adjoining bathroom should be used exclusively for the patient and attendant. They should be at the top of the house, or, if in a flat, in the most isolated portion. The sick-room should be exposed to sun and plenty of light, and have good facilities for ventilation. The latter should be continuous, and not arranged that the air from the sick-room will pass through other rooms. To guard against this, hang a sheet wet in a disinfectant inside, also outside, the closed door.

When the room is prepared, remove all unnecessary furniture, rugs, ornaments, draperies, and clothing, and exchange valuable furniture for such as will not be destroyed by disinfection, etc. When the patient is already in the room nothing must be taken from it without being first disinfected. The room must be dusted daily with a duster moistened in a disinfectant. Cover the broom used for sweeping with a large duster, likewise moistened. After use the duster should be soaked in a disinfectant and washed.

The attendant should wear an over-all for the dress and hair *whilst in the room.*

At the end of the disease the patient should be given a warm blanket bath, to which water a disinfectant has been added, and be wrapped in a warm blanket and taken to another room where he can be dressed as desired.

The room must be fumigated. In doing this, wear an over-all—to be left in the room afterwards—seal all ventilators, key-holes, chimneys, cracks, and seams around windows and doors, to ensure stillness of air, by pasting paper over them. Leave one window unlocked, though pasted over, to open afterwards to air the room. Open all cupboards and drawers. Remove sheets and pillow-cases, and treat them as during occupation. The blankets should be placed over lines stretched across the room so that the fumes can permeate them, as also curtains, blinds and rugs, if any. Mackintoshes and other rubber or leather goods should be thoroughly washed and carbolized, and taken away from the room. Take the mattress off the bedstead and place it leaning against the bedstead, so that the fumes can permeate all parts, also put the crash wire mattress over the lines provided.

Disinfection.—The oldest method of disinfection is by sulphurous acid.

"By charging the atmosphere for twenty-four hours with the gas; a subsequent thorough aeration of the room for several hours, by opening the unlocked window from the outside, then, later, freeing the chimney to allow of free circulation before entering the room by the door."

The gas was generated and employed as follows:—

Rolled sulphur broken up into pieces of about the size of a marble, placed in an iron vessel, moistened with a little methylated spirit just before leaving the room. The iron vessel is placed over a pail of water. The water, especially if hot, aids in saturating the atmosphere and thereby increasing the disinfecting power of the gas. On account of the weight of the gas, it should be liberated as high in the room as possible, i.e. from the seat of a chair placed on a table. At least 2 lb. of sulphur for every 1000 cub. ft. of air space is the quantity to use, so that about 2 per cent of sulphurous acid is furnished to the atmosphere. As soon as the sulphur is ignited, leave the room, shut the door, and lock it, taking away the key. Paste over the keyhole and all crevices, including the bottom of the door.

Before commencing to clean the room—the bedding, clothes, etc., should be placed in canvas bags—which should be damped on the outside with water to guard against the escape of bacteria during removal, and then taken to the van for removal to a disinfecting station for steam disinfection.

In cleansing the room, it may be necessary to strip the wall-paper, which is by far the best, before proceeding to clean the room. The floor and all wood fittings must be thoroughly scrubbed; all articles of furniture, including the bedstead, must be washed with cloths and disinfectant water. Articles not sent to the disinfecting station should be exposed to sunlight daily for two or three days.

The fumigation refers also to cancer and tuberculosis. Formaldehyde gas is most commonly employed. It has many advantages over any previously employed, viz.: It is really a germicide; is easy to use, and does not change the colour of fabrics of any kind: wall-paper, paint, leather or metal. There are several different lamps and preparations for generating the gas. Instructions for use are written on the boxes containing the various apparatus and preparations.

There are two things to remember when using formaldehyde. Heat and moisture are absolutely indispensable for successful disinfection. Therefore, in cold weather, the room must be heated beforehand, and, unless the apparatus is provided with means of producing watery vapours with the gas, a basin of water must be kept boiling in the room for some time before disinfection.

STAGES OF INFECTIOUS DISEASES.

The stages of infectious diseases are :—

1. *Incubation.*—The poison has gained admission to the body and is multiplying, but has as yet produced no signs, but there may be slight febrile symptoms.

2. *Invasion.*—This stage is marked by the onset of the fever and its symptoms. It is from the commencement of this stage that the duration of the fever is calculated. This gradually passes into the

3. *Stage of advance.*—When the disease is fully developed. This stage is followed by the

4. *Stage of termination*—or resolution, which may occur suddenly—crisis, or gradually—lysis. During this stage relapses are by no means uncommon.

5. Lastly, the stage of convalescence is established.

The Periods of Isolation for the Various Fevers are as follows :—

	After Accidental Exposure.	After Suffering from the Disease.
Scarlet fever .	Two weeks	Six weeks after rash appears—if no discharges.
Diphtheria . .		Until shown "free" by throat examinations.
Measles . .	Three weeks	Until three weeks after rash has gone.
Whooping-cough		May go to school six weeks after commencement of whoop, provided spasmodic cough has ceased.
Smallpox . .		Until whole of skin is free from crusts.
Chicken-pox .		Until whole of skin is free from crusts. This is 2, 3, or even 4 weeks.
German measles .		Until three weeks have elapsed from beginning of illness.
Mumps . .	Four weeks	Until one week from subsidence of swelling.
Enteric . .	None	Until at least three weeks after temperature is normal, evacuations from bowel disinfected all the time.

The Day of Commencement of the Eruption may be Remembered by Use of the following Code :—

Very (1).	Sick (2).	People (3).	Must (4).	Take (5).	Ease (6).
1st day. Varicella or chicken-pox.	2nd day. Scarlet fever.	3rd day. Smallpox.	4th day. Measles.	5th day. Typhus.	6th day. Enteric.

In German measles the rash appears on the first or second day.

In chicken-pox, successive crops of the eruption appear from day to day on the first, second, third, fourth, fifth, sixth, and sometimes up to the tenth day.

There is no rash in diphtheria, mumps, or whooping-cough.

SYMPTOMS FROM THE ONSET OF FEVERS.

For temperatures, see Chapter III.

Enteric.—During the first week—incubation stage—the patient usually goes on trying to do his work, feeling ill and depressed, and frequently complaining of severe headache. At the end of the time he has to give in and take to his bed.

As the second week advances, his face begins to assume a weary, languid expression; tongue becomes dry and red in the centre, with a band of fur on each side. About this time the rash of small rose-coloured spots appears on the abdomen; sometimes also on the chest and back. A large number of patients suffer from diarrhœa, which closely resembles pea-soup in appearance, while others are obstinately constipated. Retention of urine may be present, and should be reported to the doctor by the nurse.

If the attack is severe, the temperature remains high and is accompanied by more or less delirium with extreme muscular exhaustion. The teeth and lips are likely to be covered with sordes if not regularly cleansed. The fingers are tremulous and constantly picking at the bedclothes. The pulse is rapid and feeble; urine and motions are both passed into the bed.

While in this condition the patient may die, either from the severity of the disease, or one of its complications: (1) Perforation of the intestine; (2) peritonitis; (3) hæmorrhage from the bowel; (4) abdominal distention. On the other hand he may gradually improve.

Scarlet Fever.—The illness as a rule begins with vomiting, sore throat, and a considerable degree of fever. The tongue is thickly coated with a creamy-white fur; the pulse is markedly quickened, and the glands of the neck are swollen and painful. Towards the end of the second day the rash appears—first on the neck, chest, back and limbs, and lastly the face, leaving a white circle round the mouth. The rash consists of tiny red points set upon a vividly red background. When well marked the patient is often compared to a boiled lobster.

In the inflammation of the throat, the tonsils and soft palate are involved, the latter being like the skin, of a bright red colour.

The tongue begins to clean about the third day, and by the end of the fourth day all the fur has peeled off, leaving a red surface covered by tiny elevations which are the swollen papillæ of the tongue. This is called the "strawberry tongue," since it resembles a ripe strawberry.

The peeling commences about the fourth or fifth day, on the neck and upper part of the chest, by the formation of tiny holes in the top layer of skin, which gradually increase in size and spread all over the body.

Measles.—The illness begins with what is apparently a bad cold in the head—running from the eyes and nose. The child is out of sorts, with a moderate fever, and frequently a short, hard cough. The third or fourth day the temperature rises higher and the rash appears. It is more purple than the rash of scarlet fever. It first appears as small red spots on the face, especially on the forehead, about the roots of the hair, and behind the ears. Then it quickly spreads to the trunk of the body.

Within thirty-six hours it is fully developed.

These spots tend to arrange themselves in crescents. The rash lasts about three days, then fades, leaving a reddish-brown stain, followed by slight peeling.

Whooping-cough.—The illness begins with what is apparently a mild attack of bronchitis, accompanied by a hoarse, dry cough, and very slight degree of fever.

Within a fortnight, fits of dry coughing and straining, and later the spasmodic fits of short, rapid, expiratory coughs, and following this there is a deep inspiration, when the whoop is produced by the air being drawn quickly into the lungs through the voice-box.

There may be a second, or a third, after which the attack ends with the expulsion of gas from the stomach, and the vomiting of blood-stained matter—also food.

If a child has this spasmodic coughing, and especially if the attacks are followed by vomiting, you may be sure it is suffering from whooping-cough, even though it is never heard to whoop.

The duration of the whooping stage of the illness varies. It may be only three weeks, or it may last as long as six weeks, and, after recovery, it may recur for months afterwards whenever it catches cold.

Smallpox.—The symptoms are a sudden intense fever—103° F. or 105° F., preceded by a chill, or in children by a convulsion, severe headache, intense pain in the lumbar region and extremities, vomiting, and often delirium.

The eruption appears as an initial roseola like the rash of scarlet fever, but it has five stages :—

1. A small, hard lump is felt under the skin—lasting three days.
2. A vesicle forms above the skin—lasting three days.
3. Serous fluid of the vesicle turns to pus—lasting according to the severity of the disease. It is followed by
4. The formation over the surface of each vesicle of a crust, which also depends on the severity of the disease.
5. The separation of the crusts.

In mild cases they are little more than scales of skin, while in others they are of a thick, crusty character, and leave a deep pitting when they drop off. They generally separate about the end of the third or fourth week. Owing to the improved treatment of the present day the scar is not so deep and permanent as formerly. The temperature rises according to the rash.

Typhus.—A most highly infectious disease, and is essentially a filth disease.

The incubation stage is about twelve days.

The infection exists in the exhalation from the lungs and skin, and is also spread by vermin.

The symptoms are a chill—very rapid rise of temperature—very quick pulse, accompanied by headache, delirium. The rash is very diffuse and mulberry-coloured. It comes out in order : chest, abdomen, arms and thighs. In severe cases the patient may die in three or four days of exhaustion, before the appearance of the rash.

Diphtheria.—The illness commences more gradually than in scarlet fever. The patient is out of sorts, perhaps vomits, has a slight rise of temperature, and complains of pain in swallowing. Sometimes painful swallowing is absent even when the membrane has formed in the throat.

The tonsils are red and swollen, tongue furred, glands at the angle of the jaw (lower) are slightly enlarged and tender.

Next day greyish patches appear on one or both tonsils, and increase in size until they run together. In a mild case the membrane may not spread any further, otherwise it extends to the soft palate, and may also spread to the back of the pharynx. After about a week the membrane becomes darker in colour—decomposes. It then separates, leaving a raw surface which quickly heals.

In severe cases the membrane may extend round the back of the soft palate into the nose, giving rise to a profuse, irritating discharge from the nostrils. The treatment by injections of antitoxine has shortened the duration of the time the membrane remains in the throat. The most common causes of death in diphtheria are toxæmia, asphyxia, and sudden heart-failure.

SPECIAL POINTS TO OBSERVE WHEN NURSING INFECTIOUS FEVERS.

Enteric.—As in *all* cases of fever, the sick-room should be well ventilated ; free from draughts. In severe cases where the vitality is very low the temperature of the room should be kept at about 60° F. In milder cases 55° F. is high enough. The bed must not face the window ; should be narrow so that the patient can be easily lifted from either side. There should be moderation in bedclothes. Sponge him lightly—night and morning. Pay special attention to the back and all prominences to prevent bed-sores, also the elbows, sides of chest, inner and outer sides of knees and ankles, ears and back of the head. The tongue, teeth, roof of mouth, and inside the cheeks will need frequent and careful cleansing, in consequence of dry crusts which tend to accumulate. Should the patient perspire freely during the later stages he must be tepid sponged and put into a dry gown. Carefully handle the patient when feeding, changing bed and body linen to guard against hæmorrhage and perforation of the bowel, also heart failure. Rest must therefore be absolute.

Diet.—The prolonged illness is always accompanied by wasting. Therefore give all the nourishment that he can take. The organs of digestion are very much weaker than those of a healthy individual so they cannot do so much work. Render the work of the stomach, etc., as light as possible. Some take their food with very little trouble; others are a constant source of anxiety from the readiness with which they get indigestion. The intestines are inflamed, so give a diet which shall be thoroughly digested before it reaches that part. Fluid diet is more easy of digestion than solids and is more quickly absorbed into the circulation. The staple article of diet is milk. As milk becomes converted into a solid as soon as it reaches the stomach, watch the patient to see if he is properly digesting his food. If he is not doing so he will complain of pain at the pit of the stomach after food, or vomit curds, or pass them in his motions. Hence the importance of constant and careful examination of the stools.

The milk should be sterilized and strained before giving to the patient. A good method is to skim the milk before sterilizing, then add the cream afterwards. It is not apt to get distasteful in this way. By way of change the milk may be flavoured with tea, coffee or cocoa. Careful cleansing of the mouth before feeds—also afterwards—will lead to the better taking of food.

As to quantity of milk.—It is best diluted and given in the proportion of 5 ozs. of milk and 1 oz. of barley-water. Try and give 3 pints in twenty-four hours. Beef-tea can be alternated with milk—about one pint in twenty-four hours. Provided it does not interfere with the taking of milk, the patient may be allowed as much cold *boiled* water as he likes. It helps to flush the system. The order for the gradual return to ordinary diet is given you by the doctor. Stimulants are given according to doctor's orders.

Take temperature, pulse and respiration regularly, and report *at once* any untoward change in same. Be on the alert for symptoms of failing heart by increased pulse rate; diarrhœa, constipation, delirium, collapse, which latter may denote hæmorrhage or perforation; retention of urine, abdominal distension, and pain.

Do not allow the patient to get out of bed. Pour disinfectant into the bed-pan before and after use, then cover with damp, disinfected cloth cover. Allow to stand in the latrine until the required time for the fluid to kill the germs. Afterwards well flush the bed-pan and put in more disinfectant.

Keep the latrine well ventilated at all times and in all weathers. All soiled linen must be at once removed from the sick-room in a receptacle containing disinfectant, and well sprinkled with disinfectant, and allowed to soak for several hours before sending it to the laundry.

Never omit to wash and disinfect your hands after every duty performed; after handling soiled linen; before going to meals, using a nailbrush.

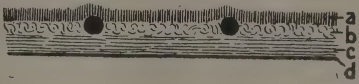

FIG. 14.—Diagram of intestinal wall, showing the four layers of the intestine. The black spots are solitary glands.

To realize the importance of careful nursing one must know the structure of the intestine which is the seat of the disease, also the process of the ulcers which are caused by the action of the germ of enteric.

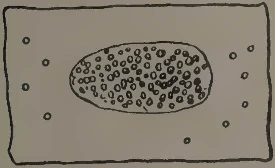

FIG. 15. — Showing Peyer's patch in the intestinal wall; solitary gland around the patch.

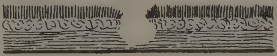

FIG. 16.—Diagram of intestinal wall, showing the ulcer after the sloughing of a solitary gland.

Structure.—It is formed of four coats.

1. Most external—excessively thin, formed by the lining membrane covering all abdominal organs. It is transparent, so that through it you can see :—

2. A muscular coat which gives support to the intestine.

3. Next comes a coat which serves merely to bind together the muscular coat; and

4. The mucous membrane coat which is most internal, and in contact with the contents of the intestine.

Lying in the space between the muscular and the mucous membrane coats are lymphatic glands in large numbers throughout the intestine, called "Solitary" glands.

In the lower half of the small intestine, near the opening into the large intestine, the glands are very numerous and collected into groups. These groups are called "Peyer's patches". It is chiefly these patches that are inflamed in enteric. Sometimes the other glands are affected.

Process of Ulcers:—

First week the glands begin to swell.

Second week the swelling subsides if inflammation is slight. If severe it goes on and sloughing commences.

Third week the slough separates, leaving ulcers of variable depth in the wall of the intestines. It is at this time that hæmorrhage and perforation may occur, hence careful handling.

Fourth week. If favourable the ulcers begin to heal.

From the illustration of the different coats of the intestine can be seen how very thin the external coat is, and hence how very readily it will break and perforation result by careless handling of the patient.

Scarlet Fever.—Always endeavour to diminish the risk of the complication—inflammation of the kidneys—by keeping the patient free from draughts in a warm room, temperature 60° F.—although well ventilated—as the poison of the disease has an irritating effect on the kidneys. The nightgown should be of flannel. The bowels must be opened regularly once a day, as in this way the kidneys are relieved of a certain amount of work. Aim at plenty of nourishment. Milk is the staple article of diet for the first three weeks. A low diet must be given while the temperature is raised and the throat inflamed. Ordinary mild cases return to solid food at the end of the first week, when they should have a bath every day to help the process of peeling. At the same time it helps the kidneys by making the skin act. The throat should be kept clean by gargling, swabbing or syringing according to doctor's orders. The ears and nose should also be kept clear of discharge by frequent syringing, as method described in Chapter VII. Report any pain in joints, ears or throat. Watch the temperature, pulse and respiration, also the urine throughout the case.

Measles.—Isolate the child from the commencement. He should be kept in bed in a warm, well-ventilated room, free from draughts. The temperature should not be allowed to fall below 60° F. nor rise above 65° F. Patients with measles require a warmer atmosphere than those suffering from scarlet fever because of the extreme liability of lung complications. The room should be darkened because of the inflammation of the eyes causing an abhorrence to light. The diet should consist of milk, beef-tea, cooling drinks, while the temperature is raised. Restlessness is best treated by tepid sponging. The ears if discharging must be gently syringed out every four hours, and their external openings afterwards lightly plugged with antiseptic wool (see Chapter VII). The eyes need frequent cleansing with antiseptic lotion (see Chapter VII). In a mild case the child is best in bed for three or four days after the temperature is normal. Guard against chills when he first goes out of doors.

Whooping-cough.—Confine to a well-ventilated and warm room. During the early stage of the illness, while he is suffering from the mild attack of bronchitis, it is best that he be put to bed. If the illness is slight and there is no sickness the child may have his usual diet. In those cases where there are frequent paroxysms of coughing, followed by vomiting, the food should be liquid, and as nourishing as possible. For not only is the child exhausted by constant coughing, but every time it vomits it loses a certain amount of nourishment. It is important that food be given soon after each attack, so that the stomach may have as much time as possible in which to digest and absorb the food, before the next fit of coughing and vomiting comes on. When the illness begins to subside, cod-liver oil and other tonics are of great service in restoring the child to health.

Broncho-Pneumonia.—A complication of measles and whooping-cough. The temperature of the sick-room should be 60° F.; no draughts. Food should be constantly and regularly given. It should be liquid and nourishing, because the constant coughing is a sore tax on the child's strength. Local treatment depends upon whether bronchitis or pneumonia is the more important element in the case. If bronchitis—owing to difficult breathing, a steam-tent and jacket-poultice may be needed. Avoid too much steam in the tent, also the making of too heavy a poultice. If the air is too moist it does harm, as also the weight of the poultice by interfering with the breathing.

If pneumonia—the child is wrapped in a cotton-wool, gamgee-tissue jacket. Steam-tent or jacket-poultice may not be ordered. The child will be treated as in acute pneumonia. Carry out all doctor's orders. Keep the bowels well regulated. Report any alteration in temperature, pulse and respiration. Note any blueness of lips, ears and fingers, and report *any* untoward signs immediately.

Smallpox.—The nurse must bear in mind the severity of this disease in its more serious forms, and must leave nothing undone for the patient's comfort. Rest, fresh air, cleanliness of patient and bedclothes, etc., are most important. Strictest attention to disinfection of clothing and all excretions; burning of swabs and discharges from sores. The strictest quarantine must be observed from the onset till the falling of the last crust. The pus from the sores should be cleansed by frequent sponging with antiseptic lotion. Itching can be much relieved by sponging, and by soaking the crusts in oil or vaseline. To prevent pitting, the patient must be restrained from scratching himself. This is best accomplished by encasing his hands in soft gloves; tying his wrists so that the face cannot be reached (see "Clove Hitch," in Chapter IX); also by fitting a mask of lint over his face. The mask and gloves should be kept constantly moist with antiseptic solutions and ointments. The eyes should be cleansed every two hours (see Chapter VII) and the mouth cleansed after feeds. The diet should be nourishing to husband the strength. Fresh air and cleanliness are of more than ordinary importance.

Typhus.—All measures should be adopted to procure absolute quietness owing to the unusually well-marked nervous symptoms in this fever. As in enteric, watch the action of the bladder, because when the patient lies in a stupor, overdistension of the bladder is likely to occur. Cleanse the mouth as in enteric. Give as much nourishment as possible. If the eruption is hæmorrhagic (bleeding from the spots) dust them with boracic powder. Place rings of wool round the patches to prevent them being in contact with the bed. The nursing is the same as in all febrile infectious diseases. An abundant supply of pure, fresh air is of the utmost importance.

Watch the temperature, pulse and respiration, because methods of reducing the temperature may be required and ordered by the doctor.

Bedsores are very apt to form and to spread with an alarming rapidity. They must be prevented by all manner of means in the nurse's power. When they have occurred and are spreading, charcoal poultices answer very well in their treatment.

The patient must be completely isolated, and the evacuations from the bowels, bladder and all discharges must be thoroughly disinfected—preferably burned.

Diphtheria.—The patient must be confined to bed, and, owing to the risk of sudden failure of the heart, constantly kept in a recumbent position, and on no account allowed to sit up or do anything for himself until the doctor permits it. In bad cases absolute rest must be maintained—often for several weeks. In the more severe forms of the disease the greatest care must be taken in maintaining the strength. The food should be liquid so long as the throat is inflamed, and as nourishing as possible; given at regular and frequent intervals. There will often be much trouble in getting young children to take their food. Paralysis of the muscles of the throat may result, and in some forms of it swallowing becomes impossible and the nasal tube—nasal feeding—has to be used. If a patient coughs when drinking, always report the fact, and watch carefully for other signs of paralysis. The throat must be swabbed carefully or syringed (see Chapter IX) without stripping it of the membrane.

In nursing diphtheria and scarlet fever be careful to keep your mouth closed when looking at or making any application to the throat. The patient may cough out some membrane or other infective material. When the patient is about to cough, turn your head away, or shut your eyes and mouth. Ophthalmia is often conveyed by means of infected material expectorated directly into the eyes.

Always have a porringer at hand in which to place the spatula, tongue depressor, forceps, or other instruments after use. Do not put instruments down on the nearest table or locker.

For wiping away discharges from the mouth, nose, ears or eyes, use pieces of rag, or mops of wool or gauze, which should at once be burnt. Burn any membrane coughed up.

Never kiss a patient who is suffering or convalescent from scarlet fever, measles or diphtheria, however mild the case.

Always have a bowl in the room, containing a towel soaked in carbolic lotion, 1 in 20, to carbolize the hands after performing all duties.

Special Points in Nursing Acute Rheumatism.

The general treatment is the same as in all fevers. Local applications are generally ordered and must be carried out strictly to orders given. Great care must be taken in applying the same to move the extremities as gently and as little as possible, for every movement is painful in the extreme. The extremities are often immobolized by the application of splints, sandbags, or pillows, and the limbs should be protected by "cradles" from the weight of the bedclothes.

The patient should wear a flannel gown—to open down the back so as to be removed without exertion to the patient. Flannel sheets, owing to the excessive perspiration, are often preferred to cotton sheets, and, unless it is too painful for the patient, they should be frequently changed. A blanket should be over the patient instead of the sheet, if flannel sheets are not procurable. Blankets, and flannel sheets placed *under* the patient are conducive to bedsores.

Move the patient as little as possible, and never allow him to exert himself, thereby avoiding strain upon the heart, especially when sponging the body, which must be done three times daily because of the excessive perspiration. Be careful not to jar the bed, nor to allow any sudden noise, such as slamming of doors and windows, etc., to startle the patient.

For diet, see Chapter VIII.

Watch for signs of approaching sudden rise of temperature, such as excitability, flushed face, bright eyes, restlessness, cessation of pains, etc. Guard against bedsores.

Special Points in Nursing Tuberculosis.

Careful disinfection of the specific discharge is necessary to avoid the spreading of the disease.

Disinfection.—Disinfection of the bedclothes, and of all dishes used for eating and drinking is advisable. *Re* sputum and sputum cup, see Chapter IV.

A constant supply of fresh, flowing air, cleanliness and nourishing food (see Chapter VIII) are the very important points in the nursing of tuberculosis. When possible the patient should be kept out of doors all day, and even all night when a sheltered place can be provided.

Open-air treatment.—The patient must be protected from draughts and be kept warm. In cold weather a hot-water bottle should be kept at his feet—or two or more if required. If the bed is made up in the manner described in Chapter I, a number of blankets can be used without incommoding the patient by their weight.

When the patient cannot be kept out of doors, the windows of his sleeping-room must be kept open, and the bed be so placed that he will get the full benefit of the in-coming air, but at the same time be protected from draughts. The floors should be devoid of carpet coverings, using small mats where necessary; furniture should be light and only of absolute necessity, to avoid taking up the air-space.

If the patient is not too weak or is not running a high temperature, the doctor may wish him to have exercise, but he must not be allowed to over-exert himself and become tired.

Owing to their lack of appetite, the dainty serving of food is of more than usual importance, and, as indigestion and lack of proper assimilation of food are apt to complicate all forms of tuberculosis, it is best served in small quantities and often. See Chapter VIII for Diet.

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CHAPTER VII.

ENEMATA, BEDSORES, FRACTURES.

Enemata.—These vary according to the object for which they are given, viz. :—

1. To produce evacuation of the bowel.
2. To check diarrhœa.
3. To nourish the patient.
4. To kill threadworms.

A purgative enema must be copious. It is given to empty the bowel and acts by—

1. Softening the matter in the bowel; and
2. By the increase in the bulk, distends and stimulates the wall of the bowel to act.

Drugs, such as glycerine, castor oil, olive oil, or turpentine may be added to it, in which case they act best if injected *first*, mixed with a small amount of the enema prepared; to be followed by the bulk of injection.

Higginson's rubber syringe answers best to give a purgative enema. It is a tube with a dilatation in the centre forming a ball. One end of the tube has a metal mechanism in it which acts as a valve to prevent the fluid drawn into the syringe from flowing back into the basin. This metal end must always be kept immersed in the water whilst giving the enema. At the other end of the tube is a small white nozzle with a shoulder-piece. This is the part to be inserted into the bowel. Before commencing to use the syringe run some warm water through it, so as to see whether it is in working order. To use the syringe, place the metal end well into the fluid, squeeze the bulb, which when it relaxes fills with the fluid, and, after placing the white nozzle into the bowel, squeeze the bulb to empty it into the bowel.

To prepare the enema.—Dissolve 1 oz. of soap in a pint of hot water—hot enough to dissolve the soap. Do not whip the soap about too much or it will cause a lather, the bubbles of which will contain air. Just occasionally stir the mixture. Use plain white soap—curd or ivory soap. If soft black or green soap be used, a piece the size of a walnut is sufficient to the pint. Do not use strong laundry soaps. Two pints are usually given to an adult, at a temperature of 99° F.

When about to give an enema, prepare the mixture as above. Place the bowl, enema syringe, small pot containing oil or vaseline on a tray. Cover it with a towel to prevent cooling. Carry it to the bed-side,—the enema fluid at a temperature of 100° F.

Prepare the patient.—Have a bed-pan under the bed. Put screens round the bed. Remove the spread. Keep the blankets next to the patient well over his shoulders and back. Stand on *his* right-hand side of the bed. Roll a small mackintosh and draw-sheet under him. Remove the pillows from under the head. Place one under the hips—under the mackintosh and draw-sheet—after placing him lying on his *left* side, with the hips well to the edge of the bed—knees drawn up. This position allows the nurse to work in a right-handed manner, and, the patient lying on the left side, the nozzle of the syringe inserted and directed "upwards and backwards" into the bowel is following in the exact direction of the rectum, which latter is directed "upwards and towards the left side of the patient".

Oil the nozzle. Fill the bulb and empty it into the bowl. Remove any bubbles from the top of the fluid on to the tray. Insert the nozzle into the rectum without uncovering the patient. To find the orifice, pass the middle finger of the left hand forwards until you reach it, and keep there while the nozzle is brought to where the point of your finger is. If the orifice contracts when touched by the nozzle, wait until it relaxes before inserting it, because if any force is used it will cause discomfort. After inserting the nozzle, give the injection very, very slowly, taking five minutes to give each pint. The patient should not be able to feel the fluid passing into the bowel. If you find that, because of the presence of hard matter in the rectum, you cannot pass the fluid into it, partially withdraw the nozzle, and pass in another ballful of fluid to soften the matter. Put the nozzle back into position again.

If the patient complains of any discomfort while the injection is being given, stop injecting fluid a little while without withdrawing the nozzle, to allow the feeling to pass away. Then continue the injection. The metal end *must* be kept *in* the fluid *all* the time, if not, air will be injected into the bowel and so cause pain and inability on the part of the patient to retain the enema for the required time to have a successful result. Try and influence the patient to retain the fluid for ten minutes.

Observe all points *re* giving an enema, so as to avoid the necessity of another enema, because an enema causes a certain amount of exhaustion, viz.: Temperature of the enema, no air bubbles, position of the patient, rate of injecting the fluid, retention of the fluid. If the injection is given slowly it will help the patient to retain it longer, and so make the evacuation easier for him.

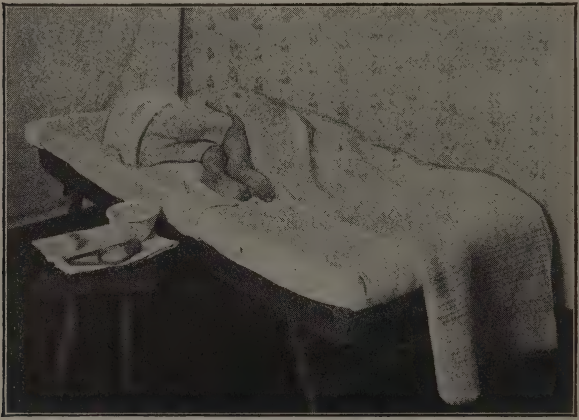

FIG. 17.—Position for all enemata except saline rectal infusion. Blanket drawn on one side to show position.

Olive oil enema.—Use a soft rubber catheter to which is attached the barrel of a glass syringe. Pour the mixture into the barrel after inserting the catheter into the rectum. Warm the oil up to 98° F. This can be done by putting the oil in a jar, and placing the jar in a bowl containing hot water for a few minutes. Then pour the oil into the barrel and give in the above manner, followed in half an hour by a soap and water enema. In severe constipation this is excellent, and is far better than exhausting the patient by giving one soap-and-water injection after another.

Salt enema.—Use soft rubber catheter, etc., as in case of olive oil enema. Make a pint of thin gruel. Add one teaspoonful of salt. Give at the usual temperature—99° F.

Glycerine enema.—This is given in sluggishness of the bowel. It acts by irritating and so stimulating the bowel. Therefore it should not be diluted. A glass and vulcanite syringe is the best to use. An ordinary glass syringe may be used, taking care not to break the nozzle. Draw the glycerine into the syringe. Then hold the barrel of the syringe in a bowl containing hot water to warm the glycerine. Give as an ordinary enema; the patient in the same position.

Glycerine, also other suppositories are often ordered. The patient should be in the same position as when giving an enema. Hold the base of the suppository in a 2 in. square piece of clean rag or wool; oil or grease the pointed end and insert as enema nozzle; press on the orifice for two or three seconds.

Turpentine enema.—Given in cases of flatulence. Owing to its irritating properties, turpentine is best made into an emulsion with oil.

To prepare the emulsion.—Heat the oil in a jar to 100° F., and add the turpentine in the quantity ordered. The quantity usually given is two tablespoonfuls of turpentine and two tablespoonfuls of olive oil. Give with soft rubber catheter, etc., as in case of olive oil enema, followed by a soap-and-water enema.

Starch enema.—Given in diarrhœa. Dissolve one teaspoonful of starch in a little cold water, add slowly 6 oz. of boiling water, and boil for one or two minutes; at the end of which time it should be of the consistency of thick syrup. Allow it to cool to 102° F. before giving.

When opium is given, add it just before giving the enema. Give with a soft rubber catheter, to which is attached the barrel of a glass syringe. Insert catheter into rectum and pour the mixture into the barrel.

Nutrient enema.—In some illnesses it is necessary to give the stomach absolute rest. The patient is not fed by mouth, and food must be injected into the bowel. The quantity varies from 4 to 16 oz. in the case of an adult. If large quantities are given, longer intervals are arranged between feeds, but usually the feeds are given not oftener than every three or four hours. The bowel should be washed out with warm water before every feed. A soap-and-water enema should be given before the *first* nutrient enema is given and also every second morning during the course of the rectal feeding.

In the giving of a nutrient enema, it is well to use a small rubber catheter, lengthened if necessary by the addition of ten to twelve inches of rubber tubing. Insert a small funnel, or the barrel of a glass syringe—its nozzle end—in the free end of the tubing. Or, if the tubing is not used, in the catheter.

Manner of using the catheter.—It should be boiled before use. To avoid getting air into the bowel and so causing the patient any unnecessary pain, pour some liquid through the funnel, tubing and catheter and allow it to run through before inserting the catheter. To avoid waste the portion could run back into the bulk. Be careful while giving the enema never to allow the funnel to become empty, or to raise it more than 8 in. above the patient. Lubricate the catheter with vaseline before introducing it. Insert the catheter as far as possible and inject the fluid slowly by not holding the funnel too high. Remove the catheter quickly but gently. Hold a folded towel over the anus for some time after giving the enema, to ensure its retention. The patient should lie in the same position, and, if possible, for half an hour afterwards, as for a soap-and-water enema. This helps to ensure retention of food.

To prepare nutrient enema.—It should be given at a temperature of 100° F. Care must be taken in the preparation of it as the substances used, viz. egg, peptonized milk, beef peptones, are very apt to curdle if mixed or heated too quickly. The warming is best done in a double saucepan, or a jug placed in a saucepan of boiling water.

To make a nutrient of the above ingredients: Heat the milk; add the peptones, which, if solid, must be first dissolved. Then add the egg, which must be *stirred* till broken, and raise the whole to a temperature of 104° F., so as to be 100° F. as it flows into the bowel. The egg should not be *beaten* because too much air would thereby be incorporated.

Peptonized foods, which are partly predigested, are used for nutritive enema because the large intestine has no digestive power. Milk intended for use as nutritive enema should be peptonized for from one and a half to two hours. To peptonize milk, see Chapter VIII.

Patients having rectal feeds generally complain of thirst. If the medical man allows a little food to be given by the mouth, a tablespoonful of milk and lime-water is very good for thirst. It helps in the absorption of fluid.

Ball-syringe administration of enemata is quite out of date.

Saline infusions or enemata are very frequently given in the treatment of shock after operation, or of severe hæmorrhage, and to patients to whom fluids cannot be administered by the mouth.

The amount of the enema should be from 7 to 10 oz., and this quantity may be introduced at intervals of two hours. Sometimes a pint can be retained without difficulty. The saline should be at the temperature of 100° F. The infusions should be given by means of the tube and funnel as in the case of nutrient enemata; the patient lying on his back. Sometimes the doctor adds 10 to 15 drops of adrenalin chloride (1 in 1000) to the first infusion.

Continuous rectal saline infusions are given in severe shock and in peritonitis. The saline solution is allowed to flow continuously into the rectum through a rubber catheter and tube connected with a douche-can placed at a level of 6 to 12 in. above the anus. The fluid should be kept covered and at a temperature of 100° F., shown by a clean bath thermometer in the douche-can, and to flow at the rate of 10 to 15 oz. per hour. The anus should be cleansed before and throughout the administration of infusions, and the patient should lie on his back. Before commencing the infusions, raise the foot of the bed to assist the outflow of blood from the abdominal veins; and surround the patient with warm blankets and hot-water bottles.

For other methods of saline infusions see Chapter VIII.

Bedsores.—The nurse must look upon bedsores as a reproach, for they certainly will arise from insufficient nursing. They are a variety of gangrene, arising from a defective nutrition of the part affected, and the causes are many.

For the stages of the process of a bedsore, see Chapter V. The explanation of inflammation will help one to realize the importance of using preventative methods at all times. The parts exposed to pressure are the places at which the bedsores are likely to occur, such as the lower end of the spine, the sacrum, buttocks, heels, shoulder-blades, line of the backbone, back of the head, the ears, shoulder-point, ribs by pressure of the elbows, hips, upper part of the sides of the thigh, the inner and outer sides of the elbows, knees, ankles and feet. Pressure sores may occur on patients who sit up a lot, even when sitting in a chair ; from insufficiently padded splints ; stiff or tight bandages ; also in corpulency, where folds of flesh are in contact with each other, such as under the chin, breast, and in the groins.

The predisposing causes are : lowered vitality from old age, continued high fever, extreme emaciation, general œdema (dropsy), paralysis.

The immediate causes are : moisture, wrinkles in sheets, etc., crumbs in bed, lying too long in one position.

Prevention.—Remove the cause. See to the nutrition of the patient ; fresh air in bed and bedroom ; frequent changing of bed- and body-linen as soon as they are wet or soiled. Keep a cute eye on cases where there is lack of control over the action of the bladder and bowel ; sponging of the body and general cleanliness ; change of position ; removing crumbs, etc., immediately after meals ; keeping the under-sheet, mackintosh and draw-sheet taut and free from wrinkles ; avoid a patient sitting too long on a bedpan. It may be unwise to change the position of some patients for surgical reasons, but, very often, a pillow can be gently placed a little under one side, and then, after an interval, under the other side to avoid having pressure always on the same part.

In the case of "knees falling together," place a pillow between the knees and give the patient a foot-rest.

There are various methods of avoiding pressure on bony and other prominences in contact with the bed. Air pillow—ring shape—with the circular space in the centre, can be placed so that the shoulder point, hip or ankle-joint will be raised from the bed.

To improvise such a pillow : Take a double piece of soft stout linen of such a square as the size you require the ring cushion. Place a bowl over it, upside down, and pencil round its rim. Then remove the bowl and place a smaller bowl over the square *inside* the circle, made in like manner, and pencil round its rim. Then stitch round the outer pencil mark, leaving 3 in. open so as to allow filling the cushion with bran. Cut the piece out of the inner circle, allowing half inch turnings. Turn the material so that the edges of the outer circle are inside. Turn in the edges of the inner circle and seam the two pieces together. Fill up with bran and stitch up the 3 in. space. Do not pack too tight or the cushion will be hard. Rings of tow, covered with wool, may be used for the same purpose. This arrangement is called a "bird's-nest". Take a large piece of tow from the roll and lay it round your hand and forearm; holding the end between your thumb and finger.

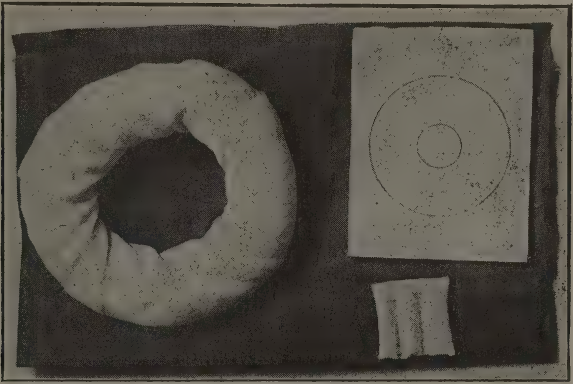

FIG. 18.—Showing "bird's-nest" pad; powder pad; and diagram for ring cushion, as description.

Repeat the rounds until you have a firm soft pad. The tow should be well opened to remove the hardness. Cover the ring of tow on all sides. Secure with a bandage encircling the tow and wool. A jaconette covering will economize in cases of incontinence.

Small square or oblong pads made of a double piece of muslin, in the shape of a bag with the top left open, and filled with powder, make excellent pads; the powder keeps the part dry. To make them, stitch to shape; then run a thread from top to bottom at intervals of about one inch, sewing the two surfaces together to form partitions lying parallel with each other. With a teaspoon, fill each of these spaces with powder, then sew up the top of the bag. Pad with wool and bandage all joints liable to pressure on body or bed.

Wash all parts at least three times in twenty-four hours; oftener if conditions are unfavourable, and rub with spirit lotion (see Chapter VI) and apply powder, or, in incontinent cases, rub in some ointment, leaving a greasy surface, so that the moisture will run off the skin.

In incontinent cases it is best to grease well the whole of the back and down the thighs. Do not put powder on after applying ointment because they tend to cake together and cause bedsores.

Avoid breaking the skin of a threatening bedsore, because where there is discharge from a wound there is lowered vitality. Massage round it, also round any actual bedsores to stimulate and so favour healing of the wound. Always report the slightest sign of redness of the skin to the doctor.

Zinc, castor oil and zinc ointment, also a paste made of one part starch powder and four parts vaseline are good ointments to use. Olive oil may be used.

Starch, zinc and starch, and boracic powders may be used.

The spirit lotion and ointment should be rubbed into the skin, using light friction, rubbing with a slow circular movement of the hand. In this way the friction brings the circulation of blood to the part.

Pay strict attention to all the *immediate* causes of bedsores.

Water-beds are most useful in cases of great and long-continued helplessness, because they give with the patient's movements and so prevent continuous pressure.

There are different sizes—(1) full size of bed; (2) half-size of bed; and (3) shorter ones. If the half-size or a short one is used, make the bed level above and below it by using pillows or cushions.

To fill a full-sized water-bed—place it on the bed over the mattress, which is covered with a sheet and full-sized mackintosh and drawsheet. Expel the air from the water-bed, then fill it with water at a temperature of 100° F., by using a funnel in the mouth-piece at the head of the bed. The water can be carried to the bed-side in a *bath*, and laded into the funnel with a jug. When you think you have sufficient water in the bed, put in the stopper. Press down the bed with the points of the fingers of both hands, and if they can *easily* rest on the surface below you have just the right amount of water in it.

If a small bed has to be used, it must be filled whilst placed on a board or table in a strong sheet, and carried to the bed in the latter.

Cover the water-bed with a sheet, mackintosh and drawsheet, and make up the bed in the usual way. Water used at 100° F. will be blood-heat when the patient is put in bed. Usually the heat of the patient's body will keep it at that temperature, unless the patient is old and weak. The water should be renewed frequently.

A bedsore, as soon as it forms, must be rendered as healthy as possible. Treatment is ordered by the doctor. Usually boracic fomentations, ointment dressings, and stimulating lotions on lint. Separation of sloughs is promoted by charcoal poultices. The ointment ordered should be spread on lint or linen; cut the size of the wound, over which place a pad of wool, half-inch bigger all round. Secure with adhesive plaster or bandage. Take care not to cause sores by pulling off the strapping. Take hold at each end of the strapping and draw towards the centre. Use olive oil to remove the strapping-marks before applying new strapping.

Nursing in cases of fracture.—Use a hard mattress; a fracture bed made by use of fracture-boards under the wire- or hair-mattress. Guard against bed- and splint-sores. Support the strength. Avoid movements. Do not tuck the drawsheet under the mattress. Fasten with safety-pins to the edge of the mattress. Watch the temperature, pulse and respiration.

Pelvis-fracture.—Note the action of the bowels and bladder. See that the patient does not move much. Sometimes pillows are required to help in keeping the part at rest.

Rib-fracture.—Watch for appearance of blood in the expectoration. Exercise great care not to allow any sudden or unnecessary movements of the chest and upper limbs.

Spine-fracture.—Keep at rest. Watch the action of the bowels and bladder. Incontinence is frequent and defective nutrition of the skin, so use all best methods in preventing bedsores. Watch for slight sign of bronchitis or lung trouble.

Skull-fracture.—Keep the room dark and quiet. Be very observant. Note action of bowels and bladder, pupils of the eyes, any paralysis, discharge from ears, nose or mouth. Vomiting is a common symptom. Watch the temperature, pulse and respiration. Keep the patient warm—ice-caps may be ordered. Carry out all the doctor's orders.

CHAPTER VIII.

DIETS AND FEEDING, MEDICINES, ETC.

Invalid diets and feeding.—The regulation of the diet in disease is of the greatest importance, and constitutes sometimes the chief part of the treatment. In cases of weak and otherwise impaired digestion all articles of food difficult of digestion should be avoided. In fevers and acute inflammatory disorders solid food cannot be given, as a rule, and milk must often form the staple article of diet. In all diseases food must be given in less quantity, and, consequently, more frequently than in health.

In convalescence from acute diseases the ordinary diet must be gradually returned to—fish, eggs and milk puddings being among the solids first ordered; to be followed with white meats, etc. Milk is the most easily digested form of proteid. It contains all the ingredients necessary to maintain life, but it would have to be taken in too large quantities to sustain life by those leading an active life.

Casein in milk is the most indigestible part of milk. When casein is not properly digested by a patient, curds are present in the stools.

It is then often removed by clotting milk with rennet and straining off the whey.

At other times, lime-water, barley-water, aerated waters, or a peptonizing powder are added to the milk. The first works by rendering the reaction of the milk so alkaline that it is not easily curdled. Barley and aerated waters prevent the hard curdling by separating the particles of casein. Peptonizing powder partly predigests the milk for the patient.

Use a food-thermometer to test the heat of foods.

Diets in Disease.

Anæmia.—Give foods easy of digestion, such as milk, eggs, rare beef, sweet fruit.

Heart disease.—Limit liquids; an excess gives the heart more work to do; provides more fluid to escape into the tissues. Limit fats and starchy foods to avoid flatulency. Give food of high nutritive value. Some doctors order milk fortified with albumin, plasmon, milk sugar and meat extract.

Constipation.—Give foods likely to irritate the intestinal tract, such as oatmeal, wheaten foods, vegetables, fruits, plenty of water. Avoid eggs, fatty meats, and milk puddings in excess; also pastry.

Diarrhœa.—Give foods that will be nearly if not entirely digested by the stomach in the first stages. All solid food is forbidden, and even beef-tea and meat-broths should be given sparingly, because when solids get to the intestines stimulation of the bowel is increased.

Arrowroot, gruel, milk-soups, barley-water, and albumin-water may be given.

As the symptoms abate give more solids, gradually.

Dyspepsia.—Small quantities of food, well masticated, and only such as are easily digested should be given. Avoid highly seasoned foods, fat meats, pork, etc., pickled meats, fried food, game, crabs and lobsters.

Fever.—Milk answers the best requirements. Fats and starchy foods should be restricted. Meat extracts may be given. No tea, as indigestion may be caused by it.

Consumption.—Rich, but easily digested foods must be given, such as milk, raw eggs, cream, fresh butter, bacon, salad-dressings, custards, cocoa, beef, potatoes, mutton, green vegetables.

Rheumatism.—Owing to excess of acid in the system, all foods likely to generate acids should be avoided, such as sugars and red meats. All rich and highly seasoned foods must also be withheld from the diet.

Diabetes.—Owing to the incapacity to assimilate sugar, all starch and sugar, as far as possible, must be withheld. Fats, however, being the other factor in the production of heat and energy, should be given in larger quantities. (*Allow*) Meat-soups, *not* thickened with starchy food; beef-tea, fish, game, poultry, eggs; gluten, almond and bran bread. String-beans, green vegetables, tomatoes, custards, jellies, cream. Tea and coffee sweetened by saccharine. (*Avoid*) Liver, sugar, starchy foods, beets, potatoes, carrots, turnips, peas, fruits, pastry, pudding, sweet and sparkling wine.

The serving of food.—Do not waste food. See that the dishes are clean and in their proper positions on a tray, and that the latter is made to look as attractive as possible. The appetite can be excited, to some extent, by pleasant odours, and by an attractive and appetizing appearance in the food.

Badly served food will, by disgusting the patient, destroy his appetite and interfere with the digestion of the meal. Never serve too large an amount of food at one time, it often takes away the appetite. Food served in small quantities, and often, will be digested better than large quantities taken at longer intervals.

Serve everything intended to be hot, hot; and cold things, cold. Food must not be taken to a patient whilst he is having some treatment, so that it goes cold by the time he is ready. Keep it hot until the treatment is completed.

In feeding a patient, always fold a table-napkin or towel under the chin. When giving liquids, raise the head slightly by slipping your arm under the pillow, but be careful not to throw his head forward on his chest, since it makes it difficult for him to swallow.

When a patient is delirious it is often advisable to give him his food with a teaspoon. When a patient cannot sit up he must be fed with a feeding-cup. The "Ideal" feeding-cup is the best, because it can be easily cleaned.

Peptonized milk.—Use one tube of Fairchild's peptonizing powder, or 15 grains of bicarbonate of soda and 5 grains of pancreatis for every pint of milk and half a teacupful of cold water. Put the powder into a sterile bottle, add the water, and shake until the powder is dissolved. Then add the milk; cover, shake, and place in a vessel containing water at a temperature of 115° F., or as hot as the hand can stand. Keep in this temperature from one and a half to two hours. Then boil for a few minutes.

Beef-tea.—A good stimulant—not a food; beef-tea with an egg beaten up in it is a valuable sick diet. One pound of gravy beef, without fat, bone, or skin. Cut it up very small;

put into a jar with one pint of cold water; stir it up and let it stand for an hour with a cover on top. Then put the jar in a saucepan of cold water, which latter bring to the boil and let it boil gently round the jar for two hours. Add salt to taste, and strain off the liquor. Beef-tea should never boil. If done as described, the contents of the jar will be at a temperature of 170° F., which temperature is quite high enough. If it is allowed to boil the albumin in the meat will coagulate and the beef-tea be spoilt.

Arrowroot.—Put a dessertspoonful of arrowroot (proportion to a pint of fluid) into a breakfast cup, add a little cold water and blend it into a paste; then fill up with boiling water or milk. Stir until thick. If it does not thicken put it into a saucepan over the fire and stir for a minute or two. Sweeten to taste. It may be given in diarrhœa.

Whey.—Procure a bottle of essence of rennet from the grocer. Put a dessertspoonful into a pint of milk; stand in a warm place; in half an hour beat up with a fork and strain off the whey for a drink.

Barley-water.—Wash well a teacupful of pearl barley. Add to it a quart of water, sugar to taste, a few strips of lemon-rind cut thin, and only the yellow part used. Boil and allow to simmer for an hour. Strain before use.

Oatmeal gruel.—If made with milk it contains everything necessary to nourish the body. Mix thoroughly two tablespoonfuls of oatmeal in a pint of milk. Strain through a coarse strainer into a clean saucepan. Stir over the fire or gas-stove till it thickens, and boil for ten minutes, taking care it does not burn. Add salt or sugar to taste. It can be made as above with water.

Albumin water.—Take the whites of two eggs; remove the white specks; beat thoroughly; then add them to half a pint of water, and beat altogether. Stir before using.

Toast and water.—Brown a crust of bread before the fire. Place it in a jug. Pare the rind off the lemon very thinly and cut in little slices and put in the jug. Pour a quart of boiling water on it. Cover, and let it stand until cold. Then strain.

Lemonade.—Peel three lemons very thinly. Pare off all the white. Cut the lemon into very thin slices. Remove the pips. Put in a jug, adding a quarter of a pound, or more, according to taste, of sugar. Pour over it one quart of boiling water.

Oatmeal drink.—Boil a good tablespoonful of coarse Scotch oatmeal in a quart of water. Stir well to mix with the water. Add sugar or lemon to flavour.

Egg flip.—Take a yolk of an egg. Beat it up well with one ounce of milk. Add two ounces of port wine or half an ounce of brandy. Sweeten to taste.

Rice water.—Wash two tablespoonfuls of rice in cold water. Boil in one pint of water for an hour. Strain before using.

White Wine Whey.—Boil half a pint of milk. Pour into it half a wineglassful of sherry. Stir well till it curdles. Strain and give the liquid.

Raw meat juice.—Scrape the meat well. Leave to soak in half its weight of water. Press through a clean cloth, so that the juice runs through. A little salt may be added. Serve in a coloured glass because of the red fluid being disliked by patients.

Chicken-broth.—Skin and chop all the chicken meat. Place in a stewpan with the bones and cover with water, adding a sprig of parsley, a little mace, a crust of bread, salt and pepper. When sufficiently boiled, take off the broth and skim when cold.

Tea.—Tea may be made more nourishing, and also as a change, by using boiled milk instead of water. Cocoa and coffee may be made in the same way.

Savoury custard.—Warm a quarter of a pint of milk with a lump of sugar and a small piece of cinnamon. Stir into it a well-beaten egg. Put it into a cup and place the cup in a saucepan of boiling water. Stir the same way all the time it boils until it thickens. Serve in small custard glasses. Beef-tea can be used instead of milk.

Scrambled eggs.—Beat up two eggs in a basin with salt and pepper. Melt a piece of butter, the size of a walnut, in a saucepan. Place in the eggs and stir until nearly set. Serve on hot-buttered toast and hot plate.

Imperial drink.—Place a dessertspoonful of cream of tartar and two tablespoonfuls of caster sugar in a jug. Pare the rind of a lemon very thinly, and cut the lemon in little slices and put in the jug. Pour a quart of boiling water on it. Let it stand till cold. Then strain.

Medicines.—They contain drugs which belong to the various classes :—

1. Emetics—to produce vomiting.
2. Purgatives—to increase the action of the bowels.
3. Expectorants—to aid the removal of mucus from the bronchial tubes.
4. Tonics—to improve the general health.
5. Sedatives—to diminish the activity of the tissues.
6. Diuretics—to increase the flow of the urine.

There are other drugs that have special influences. There are special times to give certain kinds of medicine. The time depends on its nature and the effect sought. If prompt action is sought it is given when the stomach is empty.

The majority of cough medicines, heart tonics, bitter tonics for the stomach, alkaline tonics, are generally given before meals.

Saline aperients are given before meals, preferably before breakfast, but laxatives are given at night. Acids, iron, etc., should be given after meals. Give medicines to be taken *before* meals half an hour before the meal. And those to be taken *after* meals twenty minutes after the meal.

When giving medicines always use graduated glasses and pipettes, not spoons, for measuring. While pouring out or giving a dose, never think of anything but the work in hand. Always give exactly what is ordered.

Give medicines on time. Read the label on the bottle twice before, also once after pouring out the medicine. While pouring out the medicine, hold the label on the upper side, to avoid defacing it, and before replacing the bottle wipe its rim with a small towel carried over the arm.

To take off the cork and avoid losing same by placing on a table, hold the measure in the left hand, the bottle in the right hand; take the cork off with the little finger of the left hand and hold there until ready to re-cork the bottle.

While pouring, hold the glass with the mark of the quantity you require level with your eye. If held above the eye you will give too little, if below, too much.

Always shake the bottle before pouring out the medicine. Re-cork bottles immediately after use, as many medicines contain volatile substances and will become either stronger or weaker if left uncorked.

Give acids and medicines containing iron through a glass or straw, if possible, as they discolour the teeth.

Never allow one patient to carry medicine to another. If medicines have to be diluted, never dilute more than is necessary. Never use warm water to dilute it, use either hot or very cold.

Keep separate medicine glasses for oils and strong-smelling drugs.

When a sleeping-draught is ordered give it after the ward or room is quiet, and the patient settled for the night. See that his feet are kept warm during the night by a hot-water bottle.

Use tact when giving medicine to children. A little firm, gentle persuasion is far better than force in getting a child to swallow it. Never say the medicine is nice if it is not nice. Always use a large vessel when giving effervescing medicines.

To give castor oil.—Squeeze the juice of half a lemon into a small tumbler; move the glass round and round, so as to moisten all the inside of the glass. Pour the oil into the glass into the centre of the lemon juice. Wet the rim of the glass with the lemon. Let the patient taste the other half of the lemon, then take the oil and again taste the lemon. It is better than making a sandwich of both.

Cod-liver and other objectionable oils may be taken in the same way.

Ointments are remedies applied to the skin, and, to be efficacious, the skin should be washed with hot water before application, so as to remove dirt and natural oils from the skin. The ointment should be rubbed into the skin by slow circular rubbing with the hand, unless ordered to be applied spread on lint, etc.

Hypodermic injections.—These are given by a doctor or a trained nurse. A tray on which all the apparatus needed for hypodermic injections should be kept in the medicine cupboard.

The tray should hold:—Case containing syringe and needles; open dish for sponges and lotion; large test-tube to sterilize the syringe and needle; tumbler and medicine glass; spirit lamp, always ready trimmed; matches.

Carry tray and all materials to bedside; the tumbler covered, containing sterile water. To prepare for the doctor: Make your hands sterile, after lighting the lamp. Place a slightly wet swab in the bottom of the tray. Put a sufficient quantity of sterile water to cover the syringe and needle, or needle only, in the test-tube. If the syringe can be boiled, fix the needle in it, and place in the test-tube.

Hold the test-tube over the lamp-flame until it boils. Boil one minute. Then pour the contents of the tube over the sterile swab in the tray. With the left hand take a swab and pick up the syringe with it, holding by the barrel of the syringe. Fill the syringe with sterile water, holding the piston end with the right hand.

The doctor will then put the tablet of the drug in the medicine glass. Empty the contents of the syringe on the tablet to dissolve it. Then draw up the fluid containing the drug into the syringe again.

The skin over and 3 in. around the area where the drug has to be injected must be made perfectly sterile, using the swabs from the lotion. Do your part to calm the patient.

If the syringe has not to be boiled, boil the needle and pour over the swab as above, then fix into the syringe, using a swab, with the right hand.

After use, repeat the sterilizing of the syringe and needle, putting a fine wire through the needle to prevent rusting, etc.

The needle may be sterilized, in emergency, by passing through the flame of the lamp.

Certain weights and measured are used in dispensing.

The weights are :—

A grain	symbol	gr.
A drachm	,,	dr. or ʒi.
An ounce	,,	oz. or ℥i.
A pound	,,	lb.

The measures are :—

A minim	symbol	♏.
A fluid drachm	,,	ʒ (fl.).
A fluid ounce	,,	℥ (fl.).
A pint, fluid	,,	Oi (fl.).
A gallon, fluid	,,	Ci (fl.).

The domestic equivalents are :—

One teaspoonful = 1 drachm.
One dessertspoonful = 2 drachms.
One tablespoonful = 4 drachms, or half ounce.
One wineglassful = 1½ to 2 fluid ounces.
One teacupful = 4 to 5 fluid ounces.
One breakfastcupful = about 8 fluid ounces.

Table of fluids :—

60 minims = 1 drachm.
8 drachms = 1 ounce.
20 ounces = 1 pint.
12 ounces = 1 pound.

When giving medicines, have a basin of warm water and a towel on a tray, and wash each glass as you take it from a patient. Septic, etc., patients should have their own glasses.

Inhalations.—Drugs are given by the air-passages, as well as by mouth, etc. Oxygen inhalations are employed when, from any reason, the lungs are failing to take a sufficient amount of air. The amount of oxygen being used may be estimated, and, therefore, regulated, by making it pass through water which should be warm, the quantity passing through it being estimated by the size of the bubbles produced.

Enough oxygen to produce small bubbles suffices. The method of giving oxygen is as follows :—

Stand an oxygen tank on the floor by the bedside. Connect its faucet by means of rubber-tubing with an "oxygen bottle" half filled with warm water. Any bottle with a wide mouth and full rounded bottom will answer the purpose. Insert in the bottle a cork, preferably a rubber one, making two holes in it for the introduction of glass tubes. These tubes must be bent, and one should be longer than the other.

Attach the tubing connected with the tank to the longer one, and the second piece of rubber-tubing, long enough to reach the patient's mouth, to the shorter one. Fit a funnel into the other end of this tubing. Hold the funnel either at the side of the face, slightly tilted forward, or at least 12 in. above the mouth. Never hold it directly over the mouth, or the exhaled breath will be thrown back and the effect of the oxygen diminished.

Steam inhalations.—These are given, either plain or medicated, with any drug prescribed. Inhalers should never be used before going out of doors, going into a cold room, or through draughty passages. The best time is at night. The best inhaler is the china one, fitted with a cork, which can be removed for filling the vessel. It is pierced by a bent glass tube which the patient puts in his mouth when inhaling the steam. There is a spout at the side of the inhaler which provides for the admission of air.

To prepare the inhaler, add boiling water to the level of the air-spout—no higher. If a drug is ordered, add it to the water in the proportion ordered. Cover the inhaler with a piece of flannel—not covering the air-spout. Give it to the patient, with the air-spout farthest from the patient.

To improvise.—A large jug with a spout may be used. Cover the top, all but the spout, with a towel. A teapot makes a good inhaler; the patient inhales the steam from the spout. A coffee-pot, having a space below the spout, may be used; the patient inhaling the steam from the top; the spout acting as the air-spout. The teapot may be used in same way; spout as an air-spout.

Subcutaneous saline infusions are given in the treatment of shock after operation, or of severe hæmorrhage.

A part of the body is selected at which the subcutaneous tissue is loose. In female patients, the most suitable place is behind the breast. The skin should be cleansed with lysol, dried and swabbed with ether.

The apparatus consists of a curved, sharp-pointed hollow needle, connected by a rubber tube to a glass funnel. The whole is sterilized by boiling in plain water or saline solution, and filled with normal saline, temperature 100° F., so as to drive out all air-bubbles. The needle is then plunged obliquely through the skin; the funnel raised, and the liquid allowed to flow in slowly.

It gradually forms a swelling around the point of introduction, and this should be dispersed by stroking in different directions. It is not usually possible to inject more than a pint at one place, and even with a smaller quantity severe pain may be produced. This is the great disadvantage of subcutaneous infusions. Sometimes a double apparatus is used to introduce saline simultaneously at two points. When infusion is discontinued a collodion dressing is applied.

Intravenous saline infusion.—The vein at the front of the elbow is usually selected for the infusion. The skin over it is cleansed, and a tourniquet may be applied above the elbow to make the vein prominent.

The instruments required are: Knife, dissecting forceps, dissector, aneurism needle, and skin needle; catgut for the vein, and horse-hair for the skin.

When the vein has been isolated, two ligatures are thrown round it at a distance of ½ in. from each other. The lower one is tied tightly, and the upper one is left loose. Then an opening is made in the wall of the vein, the needle is inserted, and fixed in position by tightening the upper ligature over it. The apparatus is the same as for subcutaneous infusion, except that the needle is not sharp-pointed. It may be of metal or glass. The whole is sterilized by boiling and filled with solution, temperature 100° F., before the needle is inserted. One or two pints are allowed to flow in slowly, then the needle is withdrawn and the upper ligature is drawn tight, the skin is closed by a stitch and a dressing is applied.

The time required for the introduction of a pint of fluid is fifteen to twenty minutes. If the rate is greater or the temperature of the solution is too low, rigors and difficult breathing may occur.

CHAPTER IX.

OPERATIONS.

Preparation for operation.—The method described can be carried out, as near as possible, in the preparation for operation in a private house.

In the choice of a room a good light is the first consideration, since this is a positive necessity. The room should be convenient to the patient's bedroom. Remove all rugs, carpets, draperies, knickknacks, and unnecessary furniture. The day before the operation dust down the walls with a hair broom, covered with a duster slightly moistened with a disinfectant fluid, paying special attention to all cornices and mouldings. See that the floor is scrubbed, it should also be dusted with a damp cloth a couple of hours before the time to prepare the operation. When unable to start preparations the day before operation, it is better not to disturb the pictures, etc., and not to dust down the walls, as by doing so the dust is disturbed, and all that is left behind, not having had time to settle, will be in the air, and ready to fall on sterile objects or into the wound.

There will be needed: A narrow kitchen-table for the operating-table. If it is not long enough, place two tables together, securing the legs firmly together to keep them from slipping apart; one large table for lotions, wash-bowls, etc.; three small tables for dressings, instruments, needles, swabs, etc.; a chair and a small table for the anæsthetist.

Choose old furniture.

Protect the floor under and around the operating-table with a mackintosh, or several thicknesses of paper; cover with a sheet secured with drawing-pins at the corners.

Protect the tables for solutions, instruments and dressings with a mackintosh; cover with towels which pin to the legs of the table. Cover the legs with sterile towels. Cover the operating-table with two folded blankets. Protect with a mackintosh and secure the latter under the table. Cover with a draw-sheet. Place a blanket folded lengthwise over one-half of the table. Place a hot-water bottle at the foot and a flat pillow at the head of the table.

Operating gowns can be improvised with sterile sheets, wrapped round the body under the armpits. Pin the two ends together at the side, and the upper edges over one shoulder, and upper part of the arm. A stretcher can be improvised by tying the legs of two strong straight-legged chairs together, and then tying pillows or a blanket across their backs. Place a sheet folded in four where the buttocks will rest. This will facilitate the lifting of the patient from the stretcher to the table or bed. A padded ironing board can also be used as a substitute for a stretcher.

If the light is glaring, rub moistened whitening over the windows. Have on hand a plentiful supply of sterile towels; hot and cold sterile water in jugs covered with sterile towels; reliable sterile dressings can now be purchased at almost any drug store, but I give some details of preparation of them, also of instruments.

The arrangement of the tables should be such that the surgeon and the nurse can work in a right-handed manner. The operating-table placed in a position to ensure a good light over it.

Preparation of the patient.—To avoid tiring the patient on the day of the operation the bath is given the preceding night. It should be thorough and should include the hair, unless this has been done very recently or the patient is too weak to stand it.

Bladder.—Always see that the patient passes urine shortly before the operation.

Bowels.—The bowels should be thoroughly emptied before operation. If they are distended, there is a risk of their acting, or increasing nausea, during the operation.

A strong aperient is generally given the night before, to be followed by an enema about six hours before the operation, and is repeated if the intestine does not seem well emptied.

Diet.—To lessen the danger of nausea and the presence of much matter in the bowel, only light easily digested food is given the day before the operation, and no solid food after the evening meal. Liquids, such as Bovril, beef-tea, etc., are generally allowed until about six hours before the operation.

The cleansing and preparation of the skin will be ordered by the surgeon, and this is usually carried out the previous evening, also just before the operation is performed.

The cleansing of the skin consists of specially cleansing the "field of operation," viz., not only the skin immediately adjacent to the site of future incision, but a considerable area around it. It is important to cleanse a sufficient extent.

The first essential, after removing gross dirt, etc., by a bath, is to remove any hair growing on the operation area. Lather well with fluid soap and shaving-brush and remove the hair with a razor, taking care not to scratch or cut the skin. Wash with an antiseptic lotion, which continue for a variable time, according to the parts of the body. Then rub the skin with pledgets of wool soaked in methylated spirits. Sterile dressing, gauze swabs, or compress of appropriate size, previously prepared, being ready for application, the rest of the preparation must be done after the nurse's hands are made surgically clean. Continue washing the part with methylated spirit, using new sterile gauze swabs. Finally, if possible, stroke over the area with gauze soaked in sulphuric ether. Then apply sterile dressing or compress; place over it sterilized wool and fix the dressing with bandages. After the cleansing of the skin the operation area may be painted with tincture of iodine, which penetrates into the sweat glands and hair follicles, and so reaches bacteria which may have escaped the washing. Another advantage is that the yellow staining produced by the iodine shows the extent of the purified area. In some cases acute irritation of the skin and œdema of the area result from its application.

In emergency the part may be shaved as before mentioned, washed as thoroughly as time permits, painted with tincture of iodine, or covered with a towel wrung out of 1 in 20 carbolic lotion.

Shortly before operation remove false teeth, earrings, if any. Put on a pair of long white stockings, and see that the patient is quite warm, wearing a flannel gown, and well covered before going into the room.

After the patient is removed to the operating-room, the bed to which he has to return should be made up ready for him; a blanket to fit over him instead of the top-sheet.

Sterilization of instruments.—There are special vessels for sterilizing, but to improvise a sterilizer, use a fish-kettle, in which case fix a pair of forceps to the handle, with tape, the forceps to be hanging into the solution. The forceps are to use when removing the instruments from the sterilizer to their trays. Boil in a 1 per cent solution of soda. Never put instruments into the sterilizer until the water is boiling. Always put them in blunt end foremost. Always open or unclasp scissors and other hinged instruments before putting them in the sterilizer. Wind lint or gauze around the blades of scalpels and other cutting instruments. Remove wires from needles, and run wires and needles into lint or gauze; protect their points carefully. Boil blunt instruments for five minutes; sharp ones thirty seconds.

Cleansing of instruments.—Wash with cold water the blood and discharge from them. Sterilize. When perfectly clean dry them thoroughly with soft lint or gauze. Dry the inside of needles by alternately inserting and removing the wire, drying it each time before inserting. Always put needles away with wires in them.

As instruments can easily be gathered up with towels and soiled dressings, always count them before starting to clean them, and again before putting them away.

Syringes.—When made purely of glass—rubber packings are spoilt by boiling—put into a sterilizer while the water is cold, otherwise the glass will be broken. Boil five minutes. After boiling, test to see if it is in working order. If boiling would spoil a syringe, disinfect it by alternately drawing in and expelling disinfectant lotion several times, and immersion in the lotion.

To cleanse—wash inside and outside with cold water, then hot water and soap. After washing, sterilize or disinfect, and dry.

Solution basins, glasses and kidney bowls.—Sterilize either by boiling, exposure to steam under pressure, or by soaking in a disinfectant the length of time required to render sterile.

To cleanse—wash with cold water, then with hot water and disinfect same.

Rubber-tubing.—Boil five minutes. As rubber-tubing will float, it is well when sterilizing long pieces to tie them in gauze.

Rubber tissue should be immersed in a disinfectant lotion for twenty-four hours before use. Keep it in sterile salt solution.

Rubber gloves.—Boil five minutes. After use, wash with cold water, then hot water and soap, then dry well with towels, and powder with talcum or other antiseptic powder, both inside and outside.

Dressings, sponges, etc., are sterilized by either dry sterilization, steam under pressure, in dressing-tins or bundles, and should not be opened until the surgeon or dresser requires the contents. The dressings should be placed in the tins or drums in order as they will be required. The drums or tins should be lined with lint.

To make wool pledgets, pads and sponges.—Warm the white absorbent wool before the fire, enclosed between clean towels or a sheet. This will air the wool and open it, showing the different layers of the wool.

Pledgets.—Use wool and gauze. Cut the wool into 3 in. squares; divide each square into pieces of two or three layers each. Cut the gauze into pieces 6½ by 7 in. Place one piece of wool inside the gauze as illustrated. Any size of pad may be made in this manner. For abdominal operations, they are made in sizes: 12 × 15 in., 12 × 5 in., 12 × 3 in., and only *one* layer of wool put inside the gauze. Six-inch tapes should be stitched on one corner of the pledget. To facilitate keeping track of these pledgets, it is well to do them up in packages of six. They should be counted before and after an operation.

Sponges of gauze only may be made as above.

Ball pads may be made by rolling lightly in the palm of the hands several layers of wool, then enclosing them in square pieces of gauze to size. The corners of the gauze must be secured by stitching, as illustrated.

The dressings for the wound generally consist of several layers of gauze and wool cut in required size squares.

During operation.—Before the anæsthetic is given see that the neck of the gown is unfastened; that there is no exposure while getting the patient into position; that his body is well wrapped in blankets arranged smoothly and in such a manner as to completely expose the part to be operated upon when the bandage, etc., is removed, but no other portion of the body; that hot-water bottles are well secured in covers, if he is in such a condition as to require more than one; that the arms are so placed as to be out of the surgeon's way to avoid pressure and strain, also to give comfort to the patient. As stimulation may be needed at any moment, stimulants and sterile hypodermic syringe must be near at hand.

Each nurse is told her duties before the operation. During the operation she must observe what is required without having to be asked for it, and work quickly, but without the appearance of excitement or rush. It is apt to prove fatal if a nurse loses her head in an emergency. The quicker the operation is performed the better the patient's condition afterwards, therefore nurses should do everything in their power to expedite matters.

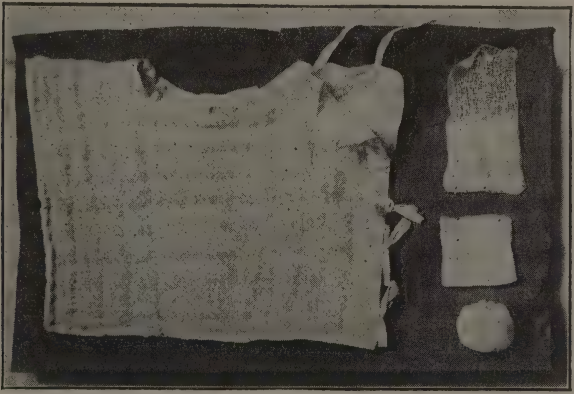

FIG. 19.—Showing gamgee-tissue jacket, also wool pledget: (i.) sides turned in; (ii.) completed; and ball pad for dressing-swabs.

When taking sterile dressings from a jar or dressing-tin, always use sterile forceps. When holding a receiver, hold it on the flat open hand; no thumb or fingers inside the receiver. The operation-room utensils should be cleansed and disinfected immediately after the operation.

After operation.—There is more or less shock, so the patient must be kept warm to avoid collapse. Therefore the bed and blankets should be warmed; hot-water bottles in readiness, which should be covered and placed in bed—after the patient is placed there—on an intervening blanket between them and the patient because of the liability to burns. The patient should not be left alone while coming out of the anæsthetic. There is a danger of his becoming restless, or of vomit getting into the windpipe. Always have a vomit-bowl ready, and while he is vomiting keep his head turned on one side, and to avoid strain on the stitches of the wound lightly place your hands one on either side of the wound. This latter point also refers to coughing. The head should lie low and have a towel under it. If crushed ice is ordered in persistent vomiting, serve it as described in Chapter IV. Watch for signs and symptoms of collapse, hæmorrhage from the wound, pain, hiccough, especially after an abdominal operation; attend to the prevention of bedsores. When a change of position is necessary, do not allow the patient to make any effort to help you.

Diet.—Give strictly according to doctor's orders. When water is allowed, give it at first in half to one teaspoonful doses of either hot or cold water. Tepid will increase nausea. Owing to the drying up of the membrane of the mouth by the anæsthetic, patients suffer from thirst for some hours after an operation. Much relief can be given by washing the mouth frequently. See Chapter II.

Bed-cradles are used to keep the weight of the bedclothes off the seat of operation, and same should be in readiness by the patient's bed.

Care of wounds.—In the dressing of wounds there are important points to observe. The main one is absolute cleanliness. Aim at not only the absence of ordinary visible dirt, but the absence of invisible dirt also, such as germs which are only visible when highly magnified. When germs gain entrance to a wound, even on the surface, they multiply in thousands of their kind, giving rise to suppuration and other serious conditions. All bowls, receivers, scissors and other instruments used in the dressing of a wound must be quite free from germs, by boiling or carbolization (see Chapter IX). Antiseptic lotions and quite sterile dressings should be used. All soiled dressings should immediately be burned after removal from the wound.

When the dressing is completed all bowls, receivers and instruments must go through the process of sterilization again.

The materials used for dressing a wound, lint, wool, gauze, protective jaconette, etc., should be kept rolled up in a fresh clean towel inside a tight-fitting box. In some hospitals special oil-tissue bags with buttoned flaps are used to enclose the dressings and are kept in a block-tin box with tight-fitting lid.

Carbolic lotion, 1 in 40, is a good antiseptic lotion for swabbing wounds. In the home boracic lotion can be used. Make the lotion by adding one teaspoonful of boracic acid crystals to a breakfastcupful of boiling water.

Salt solution is a good lotion to use in the home (see Chapter IV).

For an individual dressing at home it must be done as near as possible to the method adopted in the hospital.

Before commencing to dress the wound, make your hands and arms sterile, as described in Chapter IX. Wear a clean apron and sleeves, or an overall. See that everything required is at hand. Place them on trays (or, if bedside tables have glass or metal tops, use them) on tables. The trays and tables, including the legs of the latter, must be washed with soap and water and a disinfectant lotion, and cover with a sterile towel. Place all sterile requisites for the dressing on the towel, viz.: the towel or box containing dressings and sponges, a bowl of sponging lotion containing about six sponges, a bowl of syringing lotion, a receiver containing the syringe (if required) immersed in carbolic lotion, 1 in 20, a receiver containing the instruments immersed in carbolic lotion, 1 in 20. Cover with a sterile towel which can be used during the dressing to cover the dressing mackintosh, placing the side that has been touching the sterile objects uppermost. Have a receiver for soiled dressings on a table, or stand, apart from the sterile dressing table. Spread a mackintosh, covered by the sterile towel, under the part to be dressed.

When removing a dressing from a wound, use the forceps, and never pull it off in a forcible manner. If it adheres to the wound wet it with the solution by placing over it a wet sponge. In lifting it, it is best to use two pairs of forceps, and pull from both sides of the wound toward the centre to avoid separating the edges of the wound. If the wound is stitched, be careful not to pull the stitches.

Be thorough, yet gentle in doing this work. It is false kindness to half do the work for fear of hurting the patient. Wash all blood and discharges off the skin before putting on the new dressing. The surrounding skin should be cleansed. Whilst doing this, place a wet sponge over the wound.

When cleansing the wound do not rub or smear the sponge along the wound, just pat up the discharge, etc., and by compressing the sponge between the fingers and thumb let the lotion run over the wound. No sponge must be used a second time. Whilst reaching the new dressing, place a wet sponge over the wound.

The dressings should be cut ready, to the size of the wound; and in the case of a discharging wound, of such size as to be capable of absorbing the discharge. Apply the bandage so that the dressing can be held strictly in place.

If several dressings are to be done at a time, cleanse and disinfect the hands and arms between dressings in the same manner as before the first one.

Always dress clean before suppurating wounds. Always reinforce a dressing as soon as discharge comes through, for not only does a soiled dressing look untidy, but the gauze and wool are no longer impervious to germs.

When assisting a surgeon with a dressing the nurse should watch him closely and anticipate his wants. A good nurse has seldom to be asked for anything.

The above applies to all wounds and such as may occur in the home, viz.: abscesses, boils, whitlows, and carbuncles.

Abscesses are conditions where there is a collection of pus (matter) in the tissues. Fomentations and poultices may be applied (see Chapter V).

Boils are generally treated with poultices until they point and discharge; then boracic fomentations are applied, the matter gently expressed between dressings.

A *carbuncle* is a collection of boils, and it is wisest to have a doctor's advice and treatment. Poultices and fomentations, frequently applied, favour the collection and discharge of the wound.

Syringing the ear.—Earache is very often due to the formation of an abscess in the middle part of the ear (which is called the middle ear).

An abscess should be kept sweet and clean, and, in order to do this, it requires constant cleansing and careful covering with antiseptic dressing so as to prevent anything getting into it from the outside air. One often sees a child with a yellow discharge running from the ear, and, not only that, there is no absorbent wool in the ear. If the part which holds the wool be slightly moistened with oil it will help to keep the wool in place.

A discharging ear is caused by the formation of an abscess in the middle ear which bursts through the drum, and so discharges externally. The middle ear is quite near one of the bones of the skull. On the bone, which in parts is extremely thin, the brain rests, so that it is very close indeed to the abscess cavity. In some cases the thin part of the bone is eaten away by the abscess, which then is in contact with the brain, causing it to become inflamed, so that the child is in danger of losing its life. One should therefore endeavour to keep it sweet and so favour the healing of the abscess.

Discharging ears should be kept scrupulously clean by syringing, and the external opening carefully closed with absorbent wool after each syringing. Non-absorbent wool does not soak up the discharge. It hardens and tends to produce sore places in the canal of the ear.

To syringe the ear.—Boil the glass syringe and place it in a receiver containing antiseptic lotion. Protect the patient's shoulder with a small mackintosh and a towel; the latter protecting both sides of the mackintosh. Get the child to hold a kidney-shaped receiver, or basin, to catch the liquid, under the lobe of the ear. The nozzle of the glass syringe should, preferably, be protected with rubber-tubing. Use boracic lotion, unless otherwise ordered. Temperature 100° F. for syringing the ear.

Seating yourself, or standing opposite the affected ear, take hold of the ear at the top with the left hand, placing the thumb in the ear, as illustrated, and gently draw it backwards and upwards. By doing this you straighten the canal leading to the drum, it having a slight curve, and so make it easier for the lotion to enter it. Then place the nozzle of the syringe just within the upper part of the opening of the ear, taking care to depress the handle slightly, so that the point is directed towards and touches the roof of the canal. Then empty the syringe.

The above points must be observed, viz., the nozzle "directed very slightly upwards," because in this way the lotion is emptied on to the roof of the canal along which it runs until it reaches the drum when it turns downwards and comes out again washing everything in front of it. It is more pleasant for the patient. If you syringe straight into the ear, the lotion falls directly on the drum. This is frequently both painful and startling to the patient. In addition to this there is a danger of breaking the drum. By syringing so that the lotion runs along the roof of the ear, the drum receives no shock, and the operation is less unpleasant. Dry the ear after syringing and fix in the absorbent wool. Boil the syringe after use.

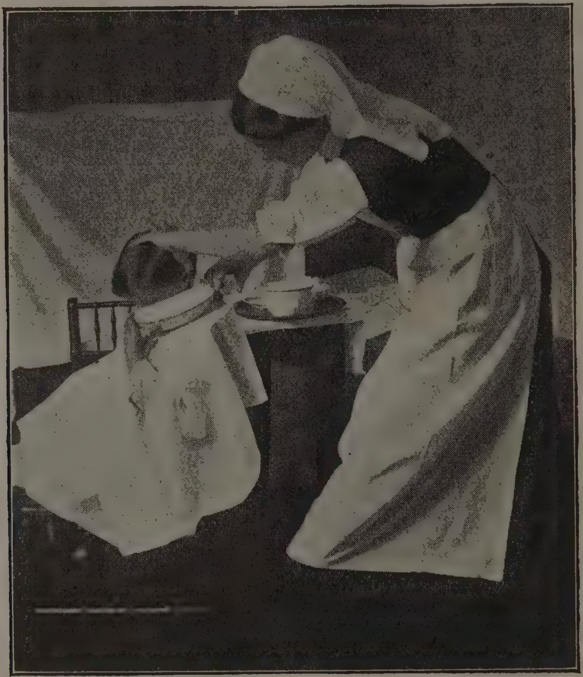

FIG. 20.—Syringing the ears.

Syringing the nose.—Prepare nasal syringe, or a glass syringe as in ear treatment; a bowl to catch the liquid; mackintosh and large towel to protect the shoulders and front of the patient; boracic lotion or other lotion ordered by the doctor; temperature of the lotion should be 100° F.

The great danger in nasal syringing is that if improperly performed the discharge will be washed into the Eustachian tube—a tube which runs from the middle ear to the upper part of the throat. To prevent this, the patient must be seated; instructed not to breathe through his nose; not to blow his nose while it contains the lotion; not to attempt to swallow the lotion; keep his head bent forward, otherwise some of the lotion will get into the back of the throat, and, in the effort to dislodge it, it may be forced into the Eustachian tube.

To syringe the nose.—Have the patient bend his head over the bowl and breathe through his mouth. Then insert the nozzle in one nostril. The lotion will flow into the top part of the nose, round the bone dividing the two nostrils and through the other nostril. When one side is thoroughly cleansed the nozzle is inserted into the other nostril. If the nose is blocked, do not try to force the lotion into it, or it will cause pain and may do harm. It is best to gradually clear the nostrils by swabbing with absorbent wool until the syringe can be inserted.

The illustration shows the patient seated on a chair, but in the case of a child it is better to carry out the treatment with the patient in the position as described for "Syringing the throat".

Syringing the throat.—Prepare two (4 oz.) indiarubber ball syringes with short nozzles; lotion at the temperature of 100° F.; bowl to receive the liquid. Remove the nozzles from the syringes and boil before and after use.

A mackintosh and sheet should be wrapped closely round the child if it is likely to struggle. The child should be seated in bed. The nurse places herself beside it, putting her left arm around its neck to prevent its head moving by keeping it firmly pressed against her left side, while at the same time she bends it forward over the bowl in front of her. Take a full syringe from the lotion. Pass the nozzle into the child's mouth between its back teeth, and forcibly compress the ball of the syringe. Until the child has got used to it, it will splutter and cry. It must be allowed to regain its breath before the next syringe is squeezed. By passing the nozzle between the back teeth there is less risk of the tongue intercepting the lotion on its way to the inflamed throat. By bending the child's head over the basin, the chance of fluid getting into the air-passage is very considerably diminished. Swab away the fluid from the chin.

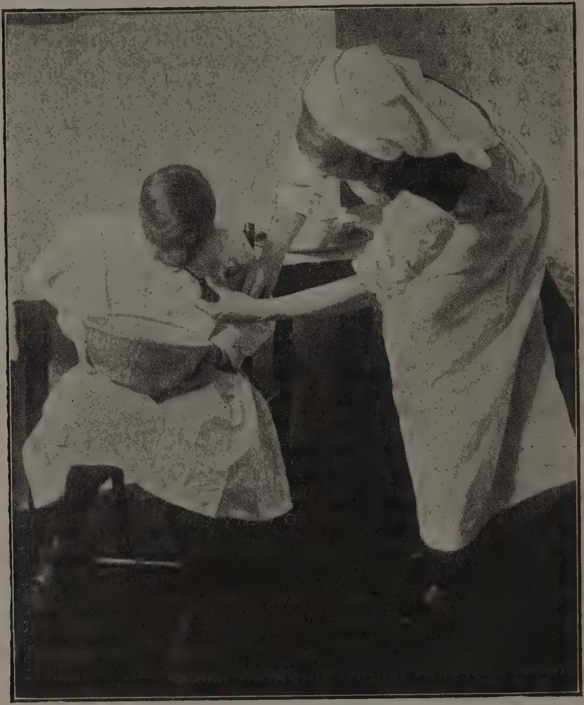

FIG. 21.—Syringing the nose. See description of another method.

Cleansing the eyes.—The eye is an organ in which disease will very quickly destroy its function. It is therefore imperative that treatment be started immediately. A delay of even a few hours, especially in suppurative cases, may mean the loss of sight. The eye must be most carefully cleansed. In cases where there is much pus (matter) it may be necessary to do this as often as every twenty to thirty minutes. If pus is allowed to remain in contact with the eyeball there is danger of ulceration. See chapter on Inflammation. Take care, when cleansing the eye, not to abrade the eyeball. Use soft pledgets of wool, about 1 in. square—never use gauze; wet in a mild antiseptic solution—boracic lotion may be used if not otherwise ordered by the doctor. Remove very gently all discharge from the eye.

The hands should be kept scrupulously clean and well disinfected. Use a carbolized towel to dry the hands after washing. The patient should be lying down—inclined to side of the affected eye—the bed and the patient protected by a mackintosh and sterile towel. Separate the lids with the thumb and first finger of the left hand, making pressure on the eyebrow and cheekbone, and have the patient look up. When this is properly done there is quite a trough between the eyeball and the lower lid, and it is into this that the lotion is poured from the swab which is well soaked in the lotion, which latter should be at the temperature of 99° F. Direct the current of the lotion from the inner to the outer angle, so as to avoid the discharge being washed into an important little sac in the inner angle, and causing a serious inflammation there. For this reason also, always wipe from the inner to the outer angle of the eye when wiping out a discharge. On the other hand when dropping into the eye any medication ordered intended to remain in the eye, drop at the outer angle. If it is dropped near the opening of the sac mentioned—at the inner angle—it will flow into the sac and the eye will not be benefited. A pipette as used for filling pens may be used as a dropper, which instrument must previously be boiled.

If both eyes require treatment, treat the least affected eye first. If only one eye is affected, protect the sound eye with a gauze or thin wool pad, held in place by a bandage which should be renewed frequently, the latter washed with a disinfectant solution. During treatment of the affected eye protect the sound eye with a pad of absorbent wool, wet with the lotion to avoid spread of infection.

CHAPTER X.

BANDAGES AND THEIR USES.

BANDAGES are used to keep applications and surgical dressings in place, to make compression, to control the circulation, to reduce swelling, to limit motion, and to afford support. They are most commonly made of either gauze, crinoline, domette, muslin, flannel, or rubber. Strips of linen may be used in the home. Gauze is usually preferred for keeping dressings in place, because it is lighter, cooler, and more easily adjusted. Crinoline, which is generally stiffened with starch or plaster of Paris, is used to give support and prevent motion. Flannel is sometimes used under plaster bandages and splints to protect the skin. They are also used to reduce swelling and œdema (dropsy), and when used for this purpose they are cut on the bias.

Rubber bandages are used to afford support, as in weak ankles, varicose veins, and to control hæmorrhage. Muslin is used to keep splints in position and as a substitute for other material. Choose muslin without dressing in it, and that which is not too heavy.

The average width and length of bandages are—¾ to 1 inch wide and 2 yards long for fingers; 2 to 2½ inches wide and 6 yards long for head and extremities; 4 to 6 inches wide and 8 yards long for the trunk. The different parts of the bandage are known as—(1) the roll, or head; (2) the initial end; (3) terminal end; (4) the outer surface; (5) the inner surface. When each end is wound towards the middle, forming two rolls, the bandage is called "a double roller".

Bandages must be smoothly and tightly rolled, and all ravellings removed. There are various machines for rolling bandages.

Points to remember in bandaging.—They must be put on tightly enough to ensure their remaining in place, but they must never be put on so tight as to cause pain by impeding the circulation, and the pressure must be even. That it may be so, no one turn of the bandage must be tighter than another, and each turn must overlap the other an equal distance.

In bandaging an extremity the toes or fingers are usually left uncovered, unless there is a dressing fixed on them, so that it can thus easily be seen whether the bandage is too tight. This also applies to the elbow and the heel. If these parts become cyanosed the bandage should be removed. Before bandaging a joint, always place the extremity involved in the position in which it will remain afterwards. When bandaging a leg always support it.

When putting on a spica of the groin place a pillow under the upper portion of the back, so that the part under which the bandage has to pass back and forth will be raised from the bed.

Never commence a bandage for either upper or lower limb by taking turns round the wrist or above the ankle as a preliminary to carrying the bandage round the hand or foot. There is a danger of the pull on the bandage by the movements of the hand or foot compressing the superficial veins in those parts and interfering with the circulation.

Always stitch, pin, or tie the bandage, so that the fold or knot will not come in contact with any part of the patient's body, or be where he will lie on it.

Always use safety-pins for pinning.

To tie—cut or tear a few inches of the end of the bandage, twist the two ends made around each other, and pass one end in one direction around the extremity, and the other in the opposite direction, and tie on the outside of the limb or body.

N.B.—Illustrations of all bandages are shown in Chapter XI.

Rules to be observed in bandaging:—

Bandage the limbs from below upwards, from fingers to shoulders, from toes to hips; chest from below upwards, from lower ribs towards the shoulders; abdomen from above downwards, from the region of the stomach to the pelvis. Stand in fron of the part to be bandaged. In the case of a capelline bandage, stand behind the patient.

In bandaging limbs, commence by placing the *outside* of the bandage to the side of the limb next the middle line of the body (inner side). Then carry the bandage *over* the limb from within outwards. Hold the bandage in the left hand when bandaging the limbs on the right side of the body, and vice versa.

The fundamental bandages on which the construction of special bandages is based are: (1) circular; (2) spiral; (3) spiral reverse; (4) recurrent; (5) figure 8. See illustrations.

The *circular bandage* consists of two or three turns, each turn covering two-thirds of the preceding one.

The *spiral bandage* can be applied only to parts of uniform circumference. It consists of circular oblique turns, each one made higher than the preceding one, but overlapping it two-thirds its width.

The *spiral reverse* consists of an ordinary spiral bandage with reverses. To make the reverse, place the thumb of the left hand—when bandaging the right limb—at the point where the reverse is to be made; pronate your right hand in which the roll is held, thus doubling the bandage upon itself, and make traction on the bandage with the right hand, and draw it well into place. Make each reverse directly above the preceding one. By thus reversing the bandage, the turns can be adjusted to the contours of the body. The reverse is principally used for the cone-shaped parts of the legs and arms.

The *figure* 8 *bandage* consists of a series of oblique turns alternately ascending and descending, and crossing each other in such a manner that they form the figure 8. This bandage is sometimes used instead of the reverse for the extremities. It is often used for the hands and feet. It is the foundation of all spica and other special bandages. It is particularly valuable to retain dressings in place, and to give support to the elbow- and knee-joints.

The *recurrent bandage* consists of a series of turns passed back and forth across the part to be bandaged, each turn overlapping the other one two-thirds its width. The ends are secured by a circular turn around them. This bandage is principally used to retain dressings in place, on the ends of fingers, toes, stumps, and the head—capelline.

Capelline bandage.—Use a double roller, made by stitching the initial ends of two bandages together. Stand behind the patient; place the seam in the centre of the forehead; carry both rolls to the back of the head—not covering the ears—

well under the occiput; reverse one roll, turning it over the other roll, which continue horizontally around the head to the forehead; bring the reversed roll across the top of the head—in the middle—to the forehead; cross it with the horizontal roll, and carry it over the top of the head to the left, and, with its edge to the centre of the turn just made, to the back of the head; cross it with the horizontal roll; return it over the top of the head to the right of the first turn, with its edge to meet the turn just made, to the forehead; cross it again with the horizontal roll. The horizontal roll is passed round the head to secure the top bandage, behind and in front, each time its reverses are made. Each turn of the top bandage should cover two-thirds of its preceding turn. Make each horizontal turn exactly cover its preceding one, and secure its *last* turn by folding in the tail of the bandage, making a mitred end, and stitch in the middle of the forehead.

Bandage for front of scalp.—Place the initial end of the bandage on one temple and fix it by two circular turns round the head. Carry the bandage downward, around the back of the head, and upwards over the brow, covering the circular turn one-half its width. Continue obliquely downwards around the nape of the neck; then up, crossing just above the ears, over the front of the head, and down again on the left side.

Monocle bandage (*left eye*).—Place the initial end of the bandage on the left temple. Take a circular turn around the head from left to right, and on to above the right ear. Then carry the bandage down the back of the head, up under the left ear; over the cheek prominence and the left eye, the lower edge of the bandage crossing the root of the nose. Pass the bandage over the right side of the face, as before; cover one half the width of the preceding turn, and make the turn *higher* on the *cheek*, and *lower* on the *right side* of the *head*. Make a third turn still higher on the cheek, and lower on the head. Secure in place with a circular turn.

Jaw bandage.—Take a long length of a 3-in. bandage; make a central parallel slit for the chin. Then cut the extremities of the bandage down the middle to about 1½ in. from the central slit. Tie these two ends so formed on either side, once—to prevent them from tearing farther. Put the chin into the central slit, and see that the slit is not too small, or it will not keep in position; neither must it be too large. It is best to make a *small* slit at the commencement. Carry one strip of the bandage from either side to the top of the head, and tie them together with a reef knot, tight enough to hold up the jaw in position. The two remaining strips are to be tied at the back of the neck, and their ends brought up and tied neatly with the loose ends of the first knot at the top of the head. These three knots are quite necessary to keep the bandage in position, whether in case of a fractured jaw or to hold the jaw in position for a few hours after death.

Suspensory bandage for the breast (*right breast*).—Place the initial end of the bandage under the left breast. Make two circular turns round the body. At the third turn, carry the bandage upwards beneath the right breast, and over the top of the right shoulder; then down the back; round the body on the left side. These turns are continued, alternately making turns round the body, beneath the breast, over the shoulder, until the breast is well suspended.

Suspensory bandage for both breasts.—Commence the bandage *beneath the left breast*, carrying it to the left and round the body twice. At the third turn, carry it upwards *beneath the left breast*, over the top of the left shoulder, down the back, round the right side of the chest, across the front, round the left side of the chest, then up the back, over the top of the right shoulder, across the chest *beneath the right breast*, round the left side of the chest, horizontally across the back, round the right side of the chest, up *beneath the left breast*, over the top of the left shoulder. Repeat these turns until five turns are passed beneath each breast.

Spica of shoulder.—Fix the initial end by two circular turns around the middle of the upper arm. Make spiral-reverse turns until reaching the armpit folds; then pass the bandage across the back, through the opposite armpit, across the chest, over and around the arm, crossing the reverse turn on its outer edge. Repeat these turns across the back, under the armpit, across the chest, over and around the arm, until the shoulder is well covered. Cover each preceding turn on the arm and shoulder two-thirds its width, but converge the bandage as it reaches the armpit on the opposite side of the body. Always place a pad of wool under the part where the bandage fits in the armpit of the second side of the body.

Spica for the hip.—Begin by slightly flexing the thigh; patient lying down. Make two circular turns round the upper fourth part of the thigh. Now make two spiral-reverses up the thigh until the groin is reached; then carry the bandage across the front of the groin—outwards and upwards—to a little above the hip-joint; then across the small of the back, and over the hip on the opposite side of the body to the front of the abdomen, and across the pubes back again to the affected groin or thigh; then to the outside of the thigh, round the back of it to the inside, and over the groin; again across the body, and so on, making each turn go about half-inch higher than the lower edge of the preceding turn. Finally fix with a stitch or safety-pin.

Descending spica for groin.—Flex the thigh. Lay the initial end of the bandage over the affected groin; now carry the bandage from within outwards across the hip on the same side, taking care that it lies as high as possible, i.e. just below the brim of the pelvis. Then pass it horizontally across the loins and round the hip on the sound side; then bring it obliquely across the front of the abdomen below the navel, over and around the thigh; and then again across the affected groin back to the first turn. And so on, causing each turn to lie on a *lower* level than the preceding turn, and to overlap it by about two-thirds the width of the bandage.

Double spica for both groins.—Slightly flex the thighs; patient lying down. Standing in front of the patient, lay the outside of the bandage in front of the right groin, carry it round the outer side of the right thigh, then over the front of the right groin, round the right hip, across the back, round the left hip, along the left groin, down the inner side of the left thigh, round the left thigh, up over the left groin, and across the lower part of the abdomen to the outer side of the right hip; the bandage is now brought round the back, across the lower part of the abdomen to the outside of the right thigh, over it to the right hip, across the back, over the left hip to left groin. These turns are continued until the part is sufficiently covered, making four or five turns each succeeding turn higher than its predecessor.

Bandage for the hand.—When it is not necessary to cover each finger separately, the dressing being fixed in one large piece over them and the palm and back of the hand, put gauze or wool over the tops of the fingers. Place the initial end of the bandage well down on the palm of the hand—the hand being in pronation. Take recurrent turns back and forth across the tops of the fingers, making your second turn obliquely to the thumb side of your first turn; covering half the width of the first turn; make your third turn obliquely on the small finger side, its edge meeting the edge of the second turn—in the middle. Repeat oblique turns, covering each preceding turn half its width, so long as the shape will allow. Hold these turns in place with your thumb and first finger of the left hand—the loops made should extend *well* under and over the hand. Secure the loops with two circular turns around the fingers; then pass the bandage obliquely across the back of the hand, around the wrist, up across the back of the hand, crossing the other oblique turn level with the little finger; around the palm of the hand, and down again across the back of the hand, making a turn lower on the hand, but overlapping the former one two-thirds its width. Repeat these turns till the hand is covered. Finish with two circular turns round the wrist, or proceed, if required, up the forearm. The stump, also the foot, is done in like manner.

Fingers.—Finger bandages are applied in cases of burns and other wounds, also to prevent swelling of the hand when splints and dressings are applied to the forearm. Place the hand in pronation, and extend the fingers. Stand opposite the finger-tips to be bandaged. Lay the outside of the bandage on the inner aspect of the wrist, leaving 6 in. of the initial end free, so that it may be used for tying the bandage when finished. Carry the roll of the bandage obliquely across the back of the hand to the root of the little finger. Take a spiral round the finger so as to bring the bandage up to the nail of the finger if in the case of "no dressing" on the tip of the finger. But if there is a dressing on the tip, do the recurrent turns over the tip in the manner as described in "Bandage for Hand," which encloses and secures a dressing. Then make ascending spiral turns, or figure-8 turns, round the finger, exposing one-third of the width of the previous turn, until the root of the finger is reached. When the bandage is brought round the little finger side of the hand, pass the bandage obliquely over the back of the hand towards the wrist, which is again embraced. The next, and each consecutive finger, including the thumb, are thus covered, and the end is tied off at the wrist. Single fingers are done as above.

Spica for thumb.—Place the hand midway between pronation and supination. Stand opposite it. Lay the initial end of the bandage across the front of the wrist, leaving 6 in. free in order to finally tie the ends. Carry the head of the bandage across the back of the root of the thumb to the forefinger side of the thumb. Then take a wide spiral turn round the thumb to within half an inch of the root of the nail. Make two circular turns round the thumb horizontally, so that the lower border of the bandage is still half an inch below the root of the nail. The next turn passes obliquely down the back of the thumb, crossing forwards to the palmar aspect to reach the ball of the thumb, whence the head is carried round the wrist; then up over the back of the hand and thumb; then round the thumb, and again obliquely across its back towards the base of the thumb in front. These turns are repeated again until five or six turns are made, the ends being then tied off at the wrist.

Bandage for hand and forearm.—To secure dressings on any part, except the finger-tips and elbow, which are left open to show the condition of the circulation: Flex the elbow, the hand and forearm directed outwards in front of the body, the hand with the thumb pointed upwards. Stand in front of the patient. Lay the outside of the bandage on the inner aspect of the wrist, carry it obliquely *over* the back of the hand, round the little finger side of the hand, across the palm, round the forefinger side of the hand, and horizontally across the back of the fingers, so that the lower border of the bandage just touches the root of the nail of the little finger. Repeat the circular turns until the lower border of the last turn is level with the root of the little finger. Then take the bandage obliquely upwards from the forefinger towards the wrist, over the back of the hand, round the wrist. The turns round the hand and wrist are repeated three or four times, making figure-8 loops. The crossings of the bandage on the back of the hand should be level with the root of the little finger. Now take the bandage upwards to the outer side of the wrist (little finger side), make three turns round the wrist, then, as the arm shapes, do spiral-reverse turns round the arm, then make figure-8 turns round the elbow-point, one loop of the 8 to embrace the forearm, and the other loop, the upper arm.

To do this, first make the lowest turn on the forearm, then the lowest turn on the upper arm, making four turns above and below the elbow-point. Then make two circular turns round the upper arm; as the arm shapes, make spiral-reverse turns to the armpit; complete with one circular turn, and secure with stitch or safety-pin. Keep the crossings of the bandage level with those of the hand.

Bandage for foot and leg.—To secure dressings on any part, except the heel and knee, which are left open to show condition of circulation: The lower limb should be raised by placing the heel on a heel-rest. Lay the outside of the bandage on the inner side of the ankle. Carry the bandage across the top of the foot in a direction towards the little toe. Bring the bandage round the sole of the foot on a level with the ball of the toes, to the inner side of the ball of the great toe, then across the top of the foot on a level with the root of the little toe, and then once more across the sole to the inner side of the foot. Thence bring the bandage across the back obliquely to the outer side of the foot, just above and behind the tip of the heel; then round the back of the heel to the inside of the ankle. Thence the bandage is brought once more round the foot, and again round the back of the heel. Figure-8 turns are thus made—one loop enclosing the foot, the other the ankle—until four turns are made. The bandage is now brought round the lower part of the leg, where three circular turns are made. At the shaping of the leg, do spiral-reverse turns to 2 in. below the knee, then make figure-8 turns round the knee-joint—one loop enclosing the lower leg, and the other enclosing the thigh. Then carry the bandage up the thigh in spiral-reverse turns; finish with two circular turns.

The foot, foot and lower leg, or thigh may be bandaged as separate applications, securing with two circular turns in each case, viz.: foot—circular turns round the ankle; foot and lower leg—circular turns round below the knee; thigh—circular turns round upper part of thigh.

Elbow bandage.—To secure a dressing on the tip of the elbow, flex the elbow; lay the outside of the bandage—initial end—on the inner side of the elbow; carry the bandage over the tip of the elbow, and round the limb at the point of the elbow; the second turn is made to encircle the upper arm, its lower edge in the middle of the first turn; the third turn is made to encircle the forearm, its upper edge exactly meeting the lower edge of the second turn. Continue these turns—figure 8—upwards and downwards alternately, covering two-thirds of the preceding turn until six turns are made. Finish with two circular turns on the upper arm. The knee is done in like manner, with the knee flexed.

Heel bandage.—To fix a dressing on the heel or ankle, support the leg so that the heel projects well over the edge of the support; lay the outside of the bandage on the inner side of the ankle; bring the bandage straight across the front of the ankle, round the outer side, and over the tip of the heel, so that the centre of the turn lies over the tip of the heel; the bandage is again carried round the ankle under the foot, its upper edge placed to the centre of the first turn under the tip of the heel. The next turn is brought round over the heel; its lower edge to meet the edge of the last turn, above the tip of the heel, and these turns are continued, alternately below and above the heel, so that the last turns are about half-way along the foot, and well above the ankle.

Four-tailed bandages are very convenient for keeping poultices and other applications in place.

For the head, take a piece of muslin—8 in. wide—and long enough to go over the scalp and tie under the chin. Cut it in the middle from each extremity to within 5 in. from the centre; place the body of the bandage on the top of the head and tie two posterior tails under the chin, and the two anterior tails at the back of the head. It can be applied in other ways, as illustrated.

Many-tailed bandage—for abdomen or leg.—They are usually made of flannel, but for lightness may be made of stout muslin. Make a double square, size of the loins, or back of leg; stitch together, leaving two sides open to insert the tails, which latter should be 3 to 4 in. wide for the abdomen; 2 to 3 in. wide for the leg. The length of the tails should be such that, in addition to the body of the bandage, it will allow the tails—one from each side—to overlap at least 4 in. when applied to the part. Neatly hem the tails, making mitred ends—the neat side goes next to the body or limb. Stitch the tails inside the square, commencing at the lower border of the double square; fix the straight edge of the first tail half inch inside; place the second tail over the first tail, covering one-third its width; the third tail over the second tail likewise; the fourth over the third, etc., until the fifth, sixth, or seventh tails are fixed in. The other side tails are done the same way.

To fix on the bandage.—Pass half the bandage under the patient in such a way that the double square will be under the body or limb, draw through on the other side, and fold the tails, alternate sides, obliquely over the abdomen, or leg, commencing at the bottom, crossing them in the centre, and securing with safety-pins at each turn, if necessary, or one straight turn pinned at the top.

A straight piece of material cut to the size of above completed article, viz. the length equal to the body and tails, may be used in emergency; the tails made by cutting from the extremities along so far as to form body and tails.

T *Bandage.*—Cut two lengths of 3 in. or 4 in. bandage or linen, a yard to 1½ yd. long. Place in the shape of a T and stitch together, as illustrated. The perpendicular tail is sometimes slit up the centre from the extremity to within 3 in. from the top, making a double T bandage.

To apply, fasten the horizontal tail around the waist, bring the tail or tails up over, or on either side of the perineum, and fasten in place on the horizontal tail. If the muslin is doubled and stitched round the edges, the bandage can be laundered and used for a long time.

In emergency, a T bandage can be made by making two slits in the perpendicular tail—each slit about 1 in. from the outside edge of the bandage—the top of each slit 1 in. from the top end of the bandage. The slits should be in depth equal to the width of the horizontal tail. Then pass the horizontal tail through the two slits. This holds in position.

[illegible] *Bandage for collar-bone* (*right side*).—After placing a pad in the right armpit, also a piece of powdered wool under the left armpit to prevent chafing, lay the forearm across the front of the chest, place a powdered wool pad between the palm of the hand and chest. The hand should be kept above the level of the elbow and pointing towards the opposite shoulder. Hold the bandage in the left hand, apply the outside of it to the inner side of the arm, immediately above the elbow, and take two turns round the arm, carrying the elbow well back at the same time. Carry the bandage across the back and round the left side to the front, where it is passed over the forearm, and over the elbow, pressing the elbow well to the side. The bandage is now carried upwards over the back to below the left armpit, then over the front, and the top of the left shoulder, and down the back to beneath the right elbow. It is then carried up the front of the right arm, over the top of the right shoulder, down across the back, round the left side of the body, to the front; again over the forearm, and so on; the turns being repeated about six or eight times round the body and over the shoulders. See illustration.

Clove hitch.—Get the required length. Make two loops forming the figure 8, as illustrated, fold the loops over each other; hold the loops in one hand, the ends in the other hand; draw tight, allowing for the limb to be passed through; pass over the limb; then make it just tight enough to prevent the limb being slipped through. Make a knot in the ends about 3 in. from the fixed loops, and tie the extremity of the bandage to bedstead or hoop over the bed.

If used to keep the hands from scratching the face in chicken-pox or smallpox, and skin diseases, the bandage may be fixed to the bed side-rails.

If after operation on the arm the limb must be raised to a certain position, the bandage may be fixed to the hoop hanging from the bed top-rail to prevent lowering the arm. See illustration of clove hitch.

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CHAPTER XI.

ILLUSTRATIONS OF BANDAGES.

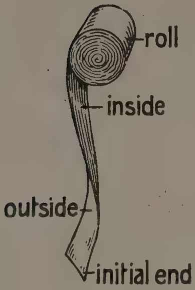


FIG. 1.—Parts of bandage.

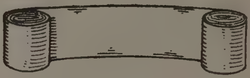


FIG. 2.—Double-headed bandage.

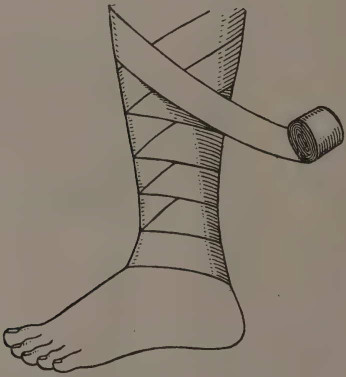


FIG. 3.—Figure of 8 bandage.

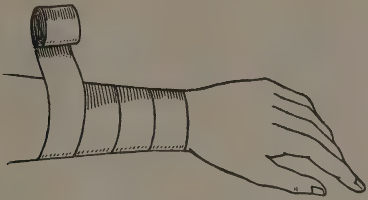


FIG. 3A.—Spiral bandage.

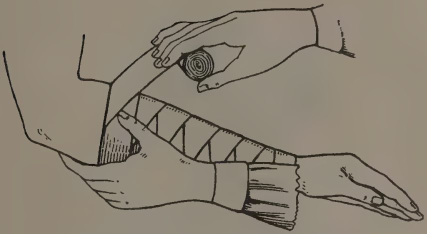


FIG. 3B.—Spiral-reverse bandage.

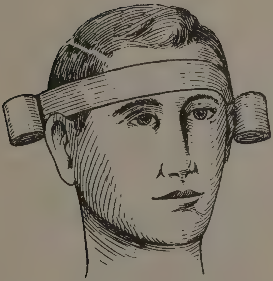
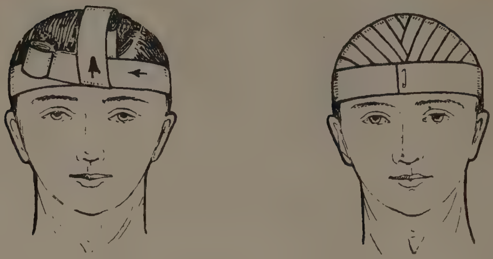


FIG. 4.—Commencing Capelline.



FIGS. 4A, 4B.—Capelline.

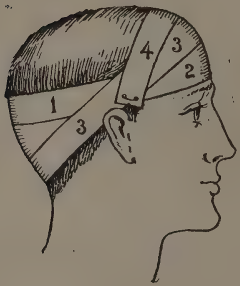
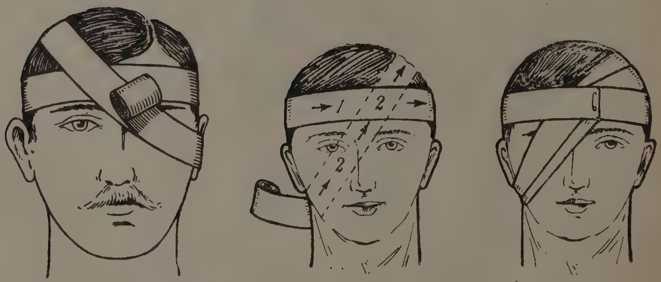


FIG. 5.—Front of scalp bandage.



FIGS. 6, 6A, 6B.—Monocle bandage.

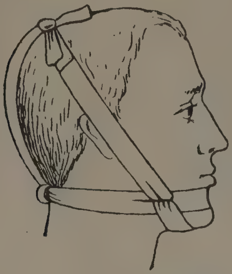


FIG. 7.—Jaw bandage.

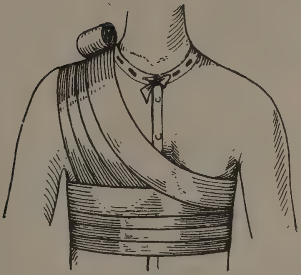


FIG. 8.—Suspensory bandage for right breast.

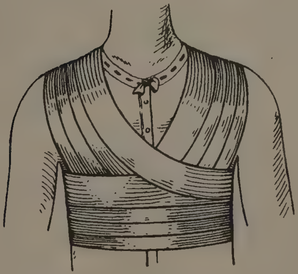
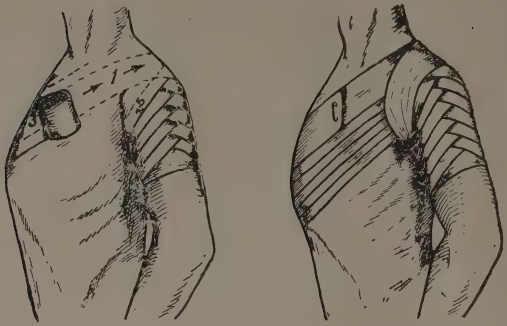
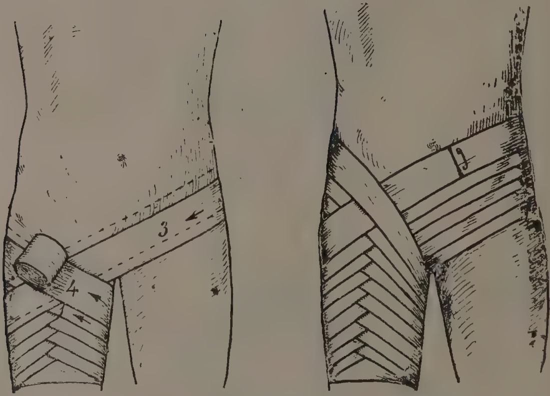


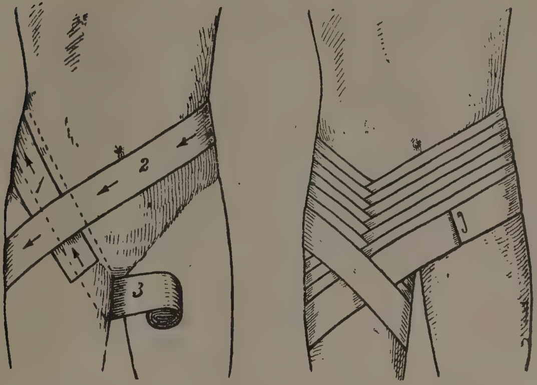
FIG. 9.—Suspensory bandage for both breasts.



FIGS. 10, 10A.—Ascending spica of shoulder.



FIGS. 11, 11A.—Ascending spica of the groin.



FIGS. 12, 12A.—Descending spica of the groin.

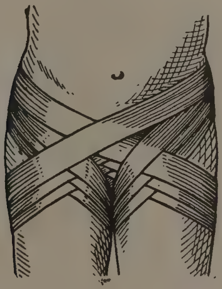
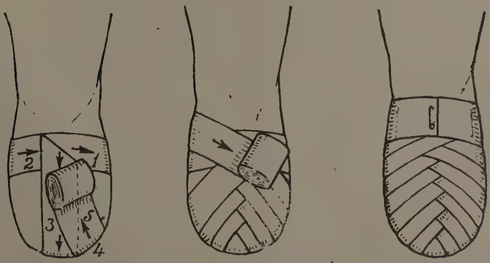
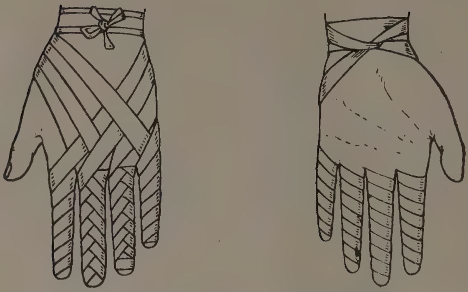


FIG. 13.—Double spica of the groins.



FIGS. 14, 14A, 14B.—Bandaged hand, foot, or stump.



FIGS. 15, 15A.—Bandaged fingers.

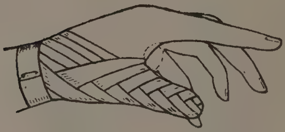


FIG. 16.—Spica of thumb.

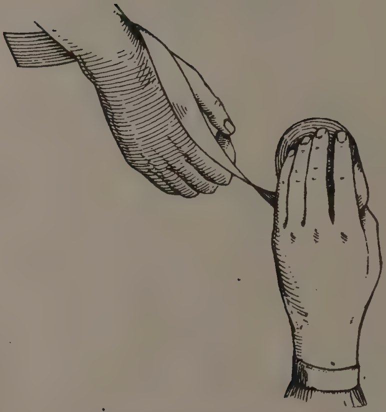
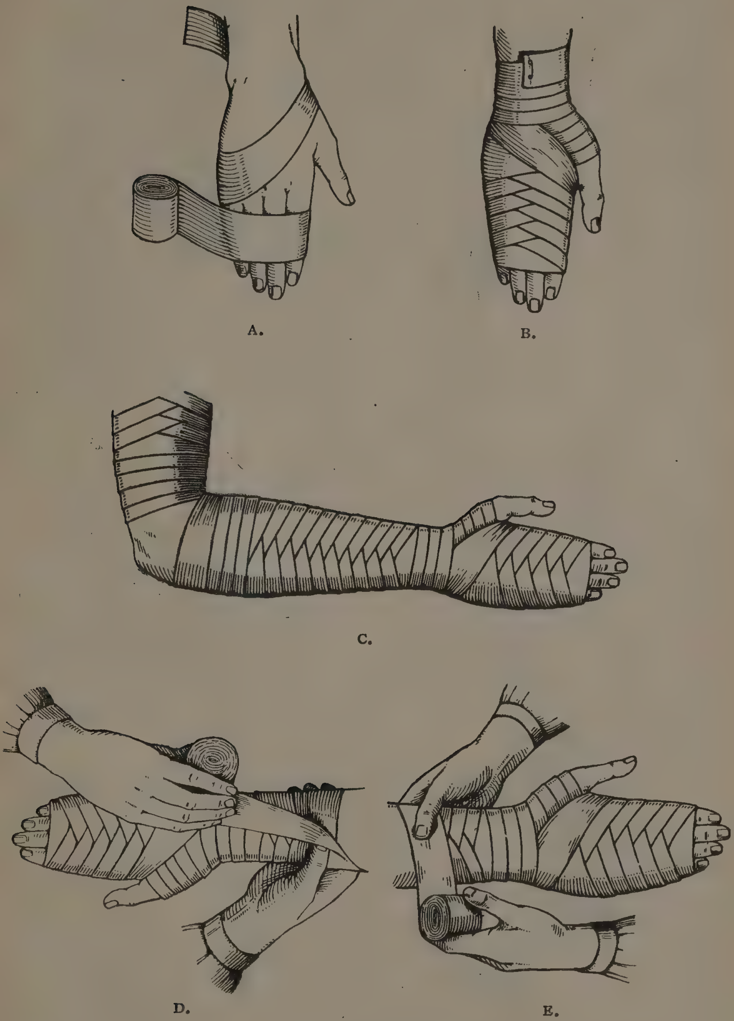


FIG. 17.—Hand and forearm showing "no turn round wrist".



FIGS. 17A, 17B, 17C, 17D, 17E.—Hand and forearm, showing "no turn round wrist".

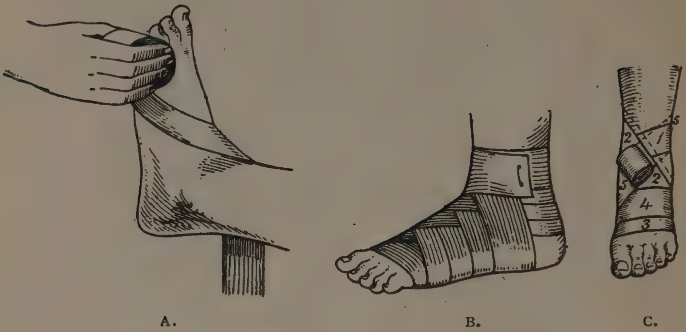


Fig. 18.—A. Starting bandage, "no turn round ankle"; B. Foot completed; C. Shows "a fixing turn round ankle".

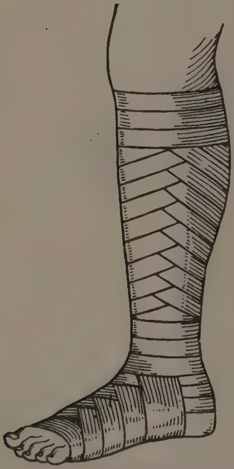


Fig. 19.—Leg and foot bandage, showing turns round the ankle when complete.

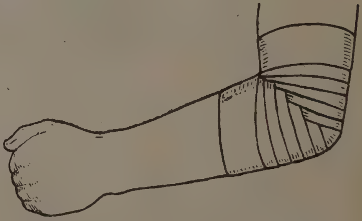


Fig. 20.—Elbow bandage, showing enclosed elbow.

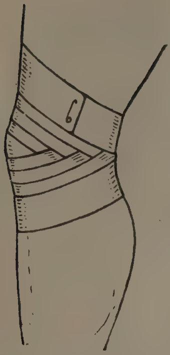


FIG. 21.—Knee bandage, showing enclosed knee.

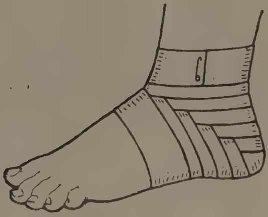


FIG. 22.—Heel bandage, showing enclosed heel.

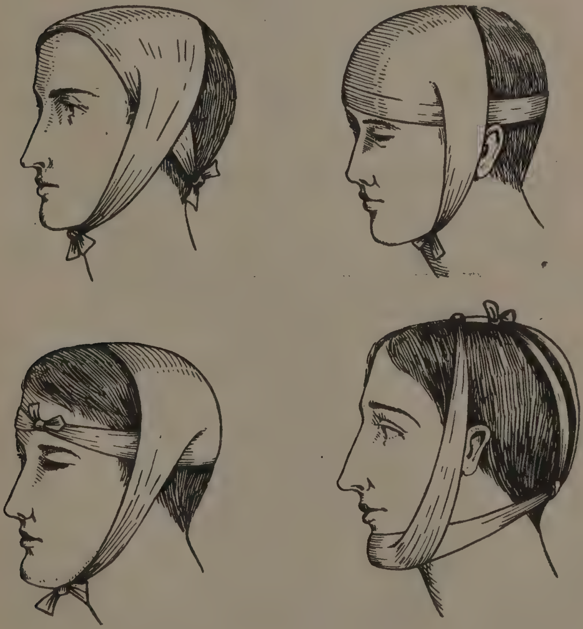


FIG. 23.—Four-tailed bandage.

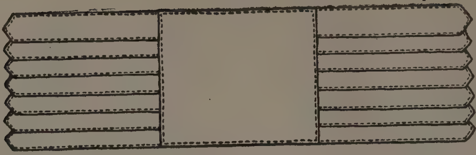


FIG. 24.—Many-tailed bandage.

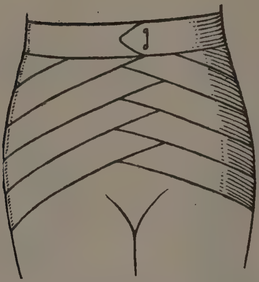


FIG. 25.—Many-tailed bandage applied.

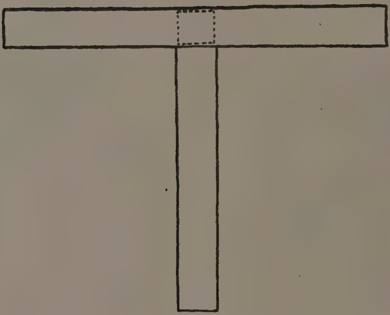


FIG. 26.—T bandage No. 1.

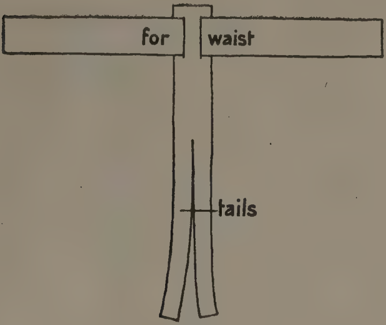


FIG. 27.—T bandage No. 2.

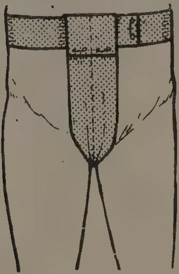


FIG. 28.—T bandage No. 3, showing the T bandage fixed.

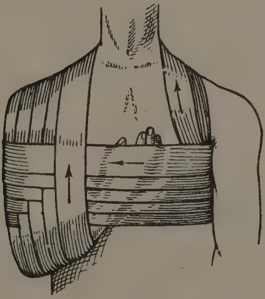


FIG. 29.—Collar-bone bandage.

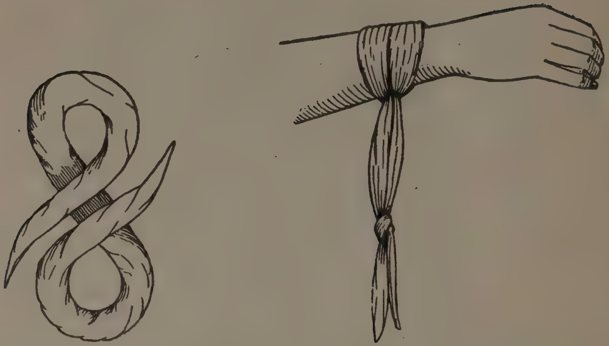


FIG. 30.—Clove Hitch—a very easy method of making a clove hitch. See description, Chapter X.

CHAPTER XII.

ILLUSTRATIONS OF SICK-ROOM APPLIANCES AND FURNITURE SUPPLIED BY THE SURGICAL MANUFACTURING CO., MORTIMER STREET, W.

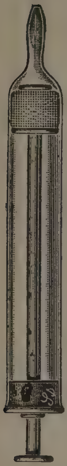


FIG. 1.—Glass syringe.

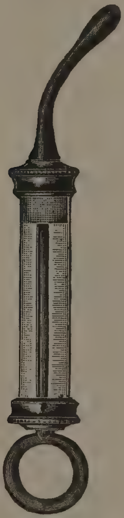


FIG. 2.—Glycerine syringe.

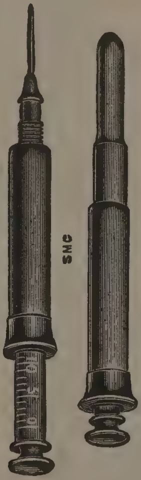


FIG. 3.—Hypo. syringe.

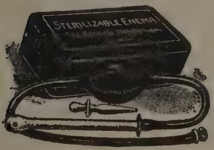


FIG. 4.—Higginson's enema syringe.

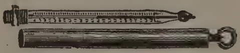


FIG. 5.—Bath and food thermometer.

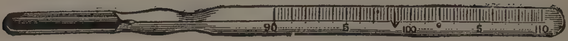


FIG. 6.—Clinical thermometer.

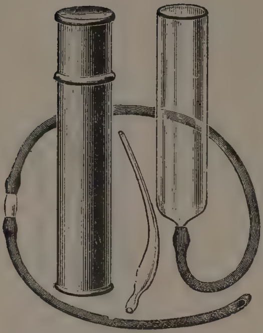
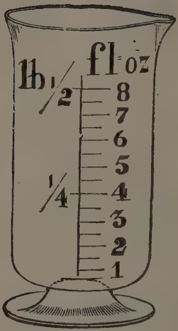


FIG. 7.—Nutrient enema tube, catheter, etc.



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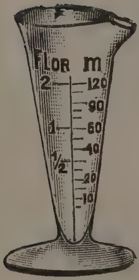

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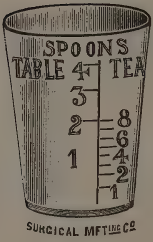

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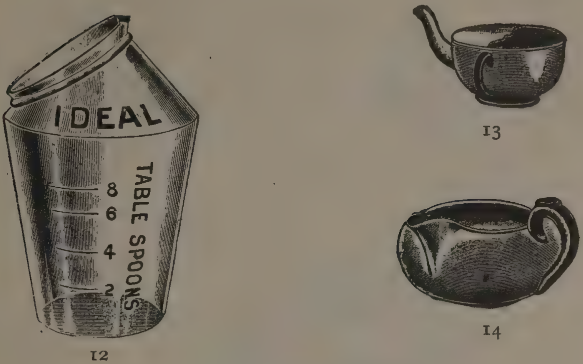
FIGS. 8, 9, 10, 11.—Measures.



FIGS. 12, 13, 14.—Feeders.

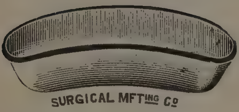


FIG. 15.—Receivers (all sizes).

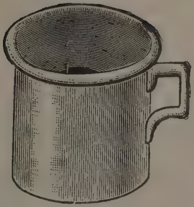


FIG. 16.—Sputum cup.

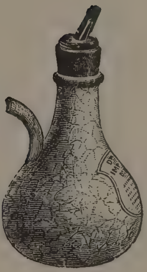
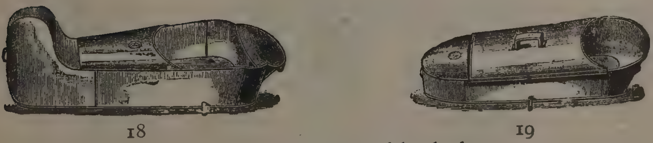


FIG. 17.—Inhaler.



FIGS. 18, 19.—Arm and leg baths.

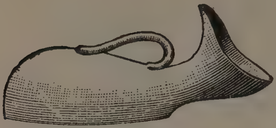


FIG. 20.—Female urinal.

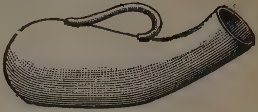
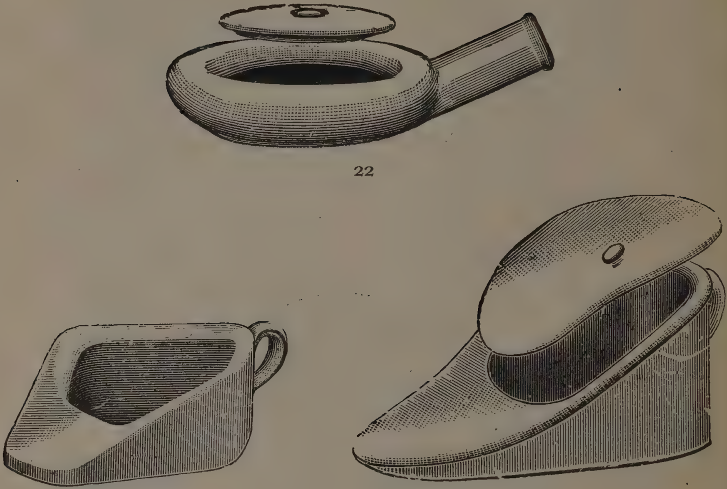


FIG. 21.—Male urinal.



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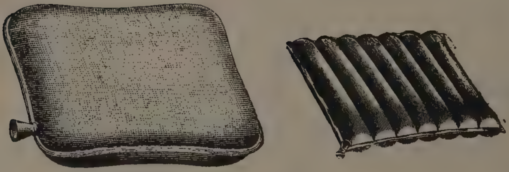
FIGS. 22, 23, 24.—Bed Pans.



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FIGS. 25, 26.—Rubber water-bed or pillow.

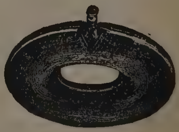
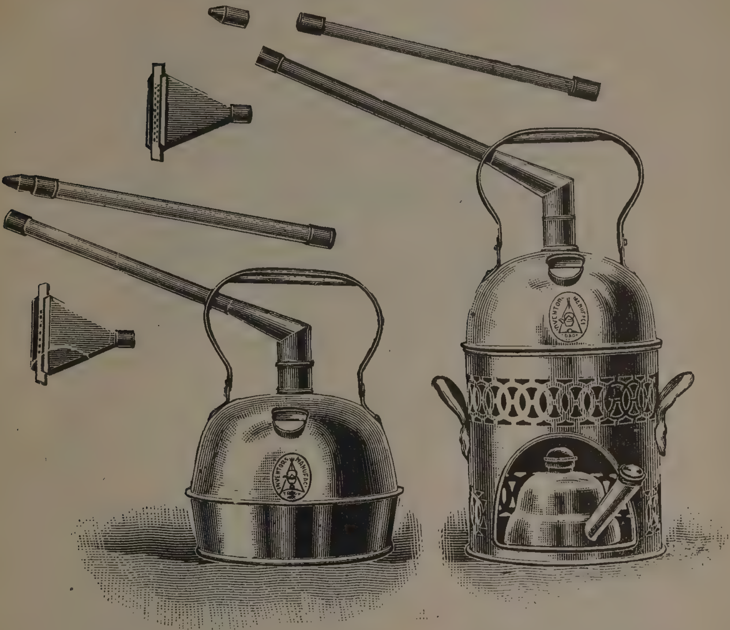


FIG. 27.—Rubber ring cushion.



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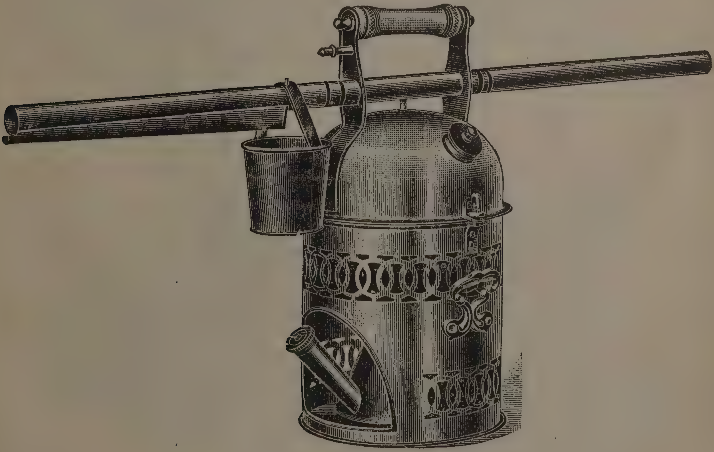

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Figs. 28, 29.—Kettles and apparatus for hot air or vapour baths.

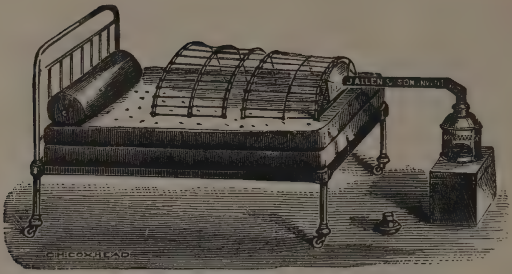

FIG. 30.—Showing kettle, etc., in position.

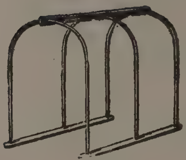

FIG. 31.—Bed cradle.

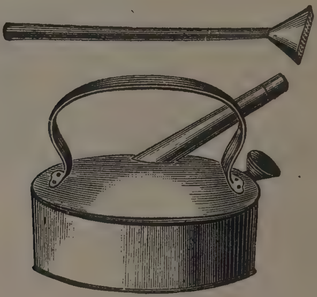

FIG. 32.—Bronchitis kettle.

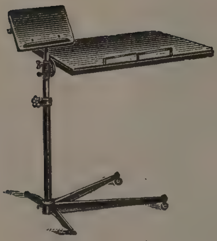

FIG. 33.

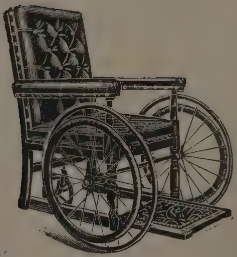

FIG. 34.

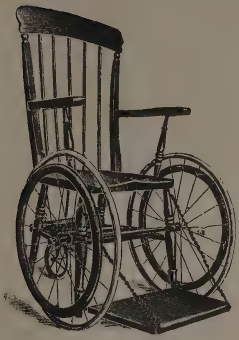

FIG. 35.

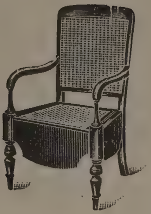

FIG. 36.

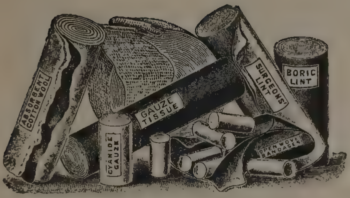

FIG. 37.

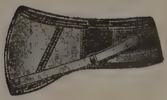

FIG. 38.—Abdominal belt.

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